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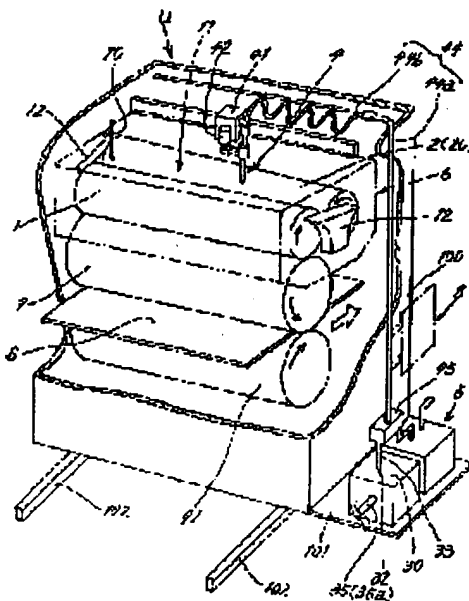
## (54) PRINTER

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To enable ink to be replaced from the outside of a printer.

**SOLUTION:** This printer is structured of an ink storage part 11 formed between an inking roll 1 and a squeeze roll 2 and a combined-use nozzle 4 for supplying and recovering ink and supplying a roll cleaning solution and recovering a waste cleaning solution, connected to an ink tank 31 and a waste solution recovery tank 5 arranged outside the printer, in a switchable manner to either of the tanks 31 and 5. The ink stored in the ink tank 31 is supplied to the ink storage part 11 from a nozzle 4 through a circulation pipe 44 by pressurizing the interior of the ink tank 31.

Further, the ink stored in the ink storage part 11 is recovered into the ink tank 31 by making the internal pressure of the ink tank 31 negative and the waste cleaning solution accumulated in the ink storage part 11 by cleaning the rolls 1 and 2 can be recovered into the waste recovery tank 5 from the nozzle 4 through the circulation pipe 44 by making the internal pressure of the waste recovery tank 5 negative. It is possible to replace an ink tank 31 outside the printer.



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CLAIMS

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[Claim(s)]

[Claim 1] Ink is accumulated in the ink reservoir section (11) formed between the converging section material (20) which made the ink attachment roll (1) and this ink attachment roll carry out press contact. By rotation of an ink attachment roll (1) In the printing machine which transfers the ink from an ink attachment roll (1) to the printing die for corrugated fibreboard attached in the printing cylinder (9) The ink reservoir section (11) is made to face the combination nozzle (4) which makes supply of ink, recovery, and recovery of roll washing waste fluid serve a double purpose. Said combination nozzle (4) is coordinated through a flow conduit (44) and a change-over valve (45) common to the ink tank (31) and waste fluid recovery tank (5) which were arranged on the outside of a printing machine. Hold an ink tank (31) in a sealing box (3), and the siphon for reduced pressure (35) and the Ayr supply pipe for pressurization (35a) are coordinated with this sealing box. The open air and cutoff are possible for a waste fluid recovery tank (5), and it is coordinated with the siphon for reduced pressure (51). The ink in an ink tank (31) is supplied to the ink reservoir section (11) through a flow conduit (44) from a combination nozzle (4) by pressurizing the inside of a sealing box (3). By collecting the ink of the ink reservoir section (11) from a combination nozzle (4) on an ink tank (31) through a flow conduit (44), and making the inside of a waste fluid recovery tank (5) into negative pressure by making the inside of a sealing box (3) into negative pressure The printing machine characterized by collecting from a combination nozzle (4) the washing waste fluid which collected on the ink reservoir section (11) by roll washing on a waste fluid recovery tank (5) through a flow conduit (44).

[Claim 2] It is the printing machine according to claim 1 with which a penetrant remover supply pipe (7) is coordinated with a flow conduit (44), and a combination nozzle (4) also makes supply of a penetrant remover serve a double purpose.

[Claim 3] a combination nozzle (4) -- the ink reservoir section (11) -- meeting -- width -- the printing machine according to claim 1 or 2 arranged movable and possible [ rise and fall ].

[Claim 4] A printing machine given in claim 1 thru/or any of 3 they are. [ by which guidance tubing (33) which became this ink tank (31) and a set from the ink tank (31) penetrates a sealing box (3) airtightly, and is connected to the change-over valve (45) removable ]

[Claim 5] After supplying ink to the ink reservoir section (11), move a combination nozzle (4) to the end side of the ink reservoir section (11), and suction recovery of the ink of the specified

quantity is carried out. The flow of the ink to this ink stripping section is produced within the ink reservoir section (11). Next, move a combination nozzle (4) to the other end side of the ink reservoir section (11), and the flow of the ink to this ink stripping section is produced by [ said ] carrying out suction recovery of the ink of the specified quantity similarly. Since a combination nozzle (4) is moved to the location distant from this ink recovery section, ink is supplied to the ink reservoir section (11). Next, during printing operation A printing machine given in claim 1 thru/or any of 4 they are. [ in which the program which repeats the cycle of ink supply in the location distant from the ink recovery in the both-ends neighborhood and this stripping section of the above-mentioned ink reservoir section (11) was included ]

[Claim 6] A combination nozzle (4) is a printing machine according to claim 5 which collects ink while carrying out predetermined section migration from the edge of the ink reservoir section (11) to the central site of the ink reservoir section (11).

[Claim 7] A printing machine given in claim 1 thru/or any of 6 they are. [ by which an ink viscosity detection means (8) to measure the viscosity of ink is built into the way of a flow conduit (44) ]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention performs supply of ink, recovery, and recovery of washing waste fluid with a common nozzle, and relates to the printing machine which has arranged the tank of ink on the outside of a printing machine, and made exchange of an ink tank easy.

[0002]

[Description of the Prior Art] There are what uses water color ink quick-drying by hypoviscosity like flexographic printing, and a method which uses the ink of \*\*\*\*\* by hyperviscosity like PURISURO printing in printing of a corrugated paper sheet. If the ink of hypoviscosity is not made to flow, in order that it may carry out a viscosity rise for a short time, As shown in drawing 7, ink is supplied to the ink reservoir section (11) which made the ink attachment roll (1) and this ink attachment roll carry out press contact and which extracts and is formed between rolls (2). A saucer (500) (500) is made to carry out an ink outflow from the both ends of the ink reservoir section (11). Ink is returned to an ink tank (502) through an ink return line (501) from a saucer (500). The ink in an ink tank (502) is sucked up with a pump (503), said ink reservoir section (11) is supplied through an ink supply pipe (504), it carries out in this way, ink is circulated, and the viscosity rise of ink is suppressed.

[0003] The penetrant remover for washing a roll (1) and (2) in the case of a color substitute of ink is supplied to the ink reservoir section (11) through an ink supply pipe (504) from the penetrant remover supply pipe (507) linked to the above-mentioned ink supply pipe (504), and washing of a roll is performed by rotation of a roll (1) and (2). Washing waste fluid is collected from an ink return pipe (501) by the waste fluid recovery tank (506) through a change-over valve (505). In the above-mentioned case, as for the circulation duct of ink, an ink supply pipe (504) and an ink return pipe (501) are needed, and it long-picture-izes, and since recovery of ink is

self-weight fall of the ink in a duct, it needs to make a duct thick to about 40mm, and needs to collect ink smoothly. When the duct where ink circulates becomes thick for a long time, in case it is a color substitute of ink, the amount of the ink which adheres and remains in a duct inside, without the ability collecting increases with a natural thing. Moreover, there will also be many amounts of ink which remain adhered to a saucer (500) (500), and ink will be consumed vainly. Moreover, in order to have washed away together on the occasion of roll washing of the ink which adhered to the inside of a duct, or a saucer so much, a lot of penetrant removers were needed and there was also a problem of waste fluid processing.

[0004] Then, the applicant proposed the printing machine which pressurizes the inside of an ink tank, supplies and decompresses ink before in the printing machine which uses the ink of hypoviscosity, and collects ink (patent No. 3009354). The above-mentioned printing machine supplies the ink of an ink tank from a nozzle to the ink reservoir section, and collects the residual ink of the ink reservoir section on an ink tank by making an ink tank into negative pressure in the case of a color substitute of ink by holding an ink tank in a sealing box, and an end's connecting to supply / recovery nozzle of ink the other end of the duct which penetrated this box airtightly and reached the ink tank, and pressurizing the inside of a sealing box. Although the washing waste fluid which extracted as the ink attachment roll and washed the roll on the occasion of a color substitute of ink collects on the ink reservoir section formed among both rolls, recovery of this washing waste fluid is performed for a nozzle and piping with the above-mentioned separate ink supply / recovery nozzle (refer to patent No. 2951637).

[0005]

[Problem(s) to be Solved by the Invention] As mentioned above, piping increases that the passage of ink and washing waste fluid is another. Moreover, in order to solve the problem of washing of piping from ink supply / recovery nozzle to the ink tank in the case of a color substitute of ink, the sealing box in which an ink tank is held approaches the ink reservoir section, is arranged, the duct from an ink tank to a nozzle is shortened, and the duct which contains this nozzle in the case of exchange of an ink tank is also exchanged together. In a corrugated paper printing machine, a sealing box serves as a height location of about 1.5m from the installation floor line of a printing machine, considering the height location of the ink reservoir section. For this reason, for ink exchange, a heavy ink tank must be lifted to a sealing box, and it is troublesome. Moreover, charge workability has bad time and effort to removal of piping from an ink tank to a nozzle, and a positioning fixed activity. Furthermore, with the airline printer which put two or more printing units in order, at every exchange of an ink tank, an adjacent printing unit must be made to have to estrange, the workspace for exchange of an ink tank must be secured, and this is reducing the operating ratio of a printing machine according to the color of ink greatly. This invention clarifies the printing machine which can solve the above-mentioned problem.

[0006]

[Means for Solving the Problem] The printing machine of this invention accumulates ink in the ink reservoir section (11) formed between the converging section material (20) which made the ink attachment roll (1) and this ink attachment roll carry out press contact. By rotation of an ink attachment roll (1) In the printing machine which transfers the ink from an ink attachment roll (1) to the printing die for corrugated fibreboard attached in the printing cylinder (9) The ink reservoir section (11) is made to face the combination nozzle (4) which makes supply of ink,

recovery, and recovery of roll washing waste fluid serve a double purpose. Said combination nozzle (4) is coordinated through a flow conduit (44) and a change-over valve (45) common to the ink tank (31) and waste fluid recovery tank (5) which were arranged on the outside of a printing machine. An ink tank (31) is held in a sealing box (3), the siphon for reduced pressure (35) and the Ayr supply pipe for pressurization (35a) are coordinated with this sealing box, the open air and cutoff are possible for a waste fluid recovery tank (5), and it is coordinated with the siphon for reduced pressure (51).

~~[0007]~~

~~[Function and Effect]~~ The ink in an ink tank (31) can be supplied to the ink reservoir section (11) from a combination nozzle (4) by pressurizing the inside of a sealing box (3). The suction recovery of the ink of the ink reservoir section (11) can be carried out by decompressing the inside of a sealing box (3) at an ink tank (31). Since it is suction recovery, even if the flow conduit (44) from the ink reservoir section (11) to a sealing box (3) is thin, it can collect ink in smooth and a short time. Moreover, since it is suction recovery, the amount of the ink which adheres in the shape of a thin film to a flow conduit (44) inside, and remains inside is a minute amount very much. Therefore, the penetrant remover which washing of a roll (1), (2), and the flow conduit (44) inside containing a combination nozzle (4) takes is little, and ends, and processing of washing waste fluid is also easy for it. This point differs from what must flush the ink which remains so much in an ink circuit by a lot of penetrant removers like [ in the ink recovery by self-weight fall of the ink in the thick duct in the conventional water-color-ink circuit system ] greatly.

[0008] The washing waste fluid which collected on the ink reservoir section (11) by roll washing is recoverable on this waste fluid recovery tank (5) by decompressing a waste fluid recovery tank (5). Washing waste fluid flows to the flow conduit (44) to the change-over valve (45) which contains a combination nozzle (4) in the case of roll washing, and the ink which has adhered to the inside of this flow conduit (44) in the shape of film thinly is also flushed. Furthermore, at the time of washing waste fluid recovery, the combination nozzle (4) is submerged in washing waste fluid, and even a nozzle tip peripheral face is flushed with waste fluid. For this reason, it is not necessary to wash separately from a roll a combination nozzle (4) and a flow conduit (44), and to exchange a combination nozzle (4) and a flow conduit (44) at every color substitute of ink. Therefore, this flow conduit (44) is pulled out to the outside of a printing machine, it considers as fixed piping, a sealing box (3) is arranged on the outside of a printing machine, and it is satisfactory for coordinating the ink tank (31) and flow conduit (44) in a sealing box (3).

[0009] Since an ink tank (31) is exchangeable on the outside of a printing machine, it becomes unnecessary to make a \*\*\*\*\* printing unit estrange for exchange of an ink tank. Therefore, also ~~in printing operation, an ink tank can be exchanged, ink can be filled-up one by one,~~ and the operating ratio of a printing machine can be raised. It becomes unnecessary to make a \*\*\*\*\* printing unit estrange also in the case of a color substitute of ink. Since the flow conduit (44) which contains a combination nozzle (4) in the case of a color substitute of ink does not need to exchange, it can arrange for an ink substitute quickly also at this point. without it lifts an ink tank (31) highly by arranging a sealing box (3) near the installation floor line of a printing machine -- an ink tank -- being exchangeable . Since supply and recovery of ink, and recovery of washing waste fluid are performed with a common nozzle, it can carry out simple [ of the piping ].

[0010]

[Embodiment of the Invention] The schematic diagram 1 of a printing machine and a printing unit is a corrugated paper printing machine using water color ink with low viscosity, and this printing machine has blanking ruled line equipment (300) which pierces two or more set [ of printing units ] U according to the feed equipment (200) which sends out one accumulated corrugated paper sheet at a time to a printing unit, and the color number of printing, and the printed sheet corresponding to a box configuration, and gives a ruled line corresponding to a bend line. Each printing unit U is arranged movable in a rail (102) (102) top, and it can open and ~~close between \*\*\*\*\* printing units, and as shown in drawing 2~~ , during printing, it is closed ~~between units and it can open between units in the case of exchange of a printing die for~~ corrugated fibreboard, or a maintenance.

[0011] the frame (100) upper part of printing unit U -- an ink attachment roll (1) -- extracting -- a roll (2) -- relative -- contact -- it arranges possible [ alienation ] and the groove ink reservoir section (11) in which the pars basilaris ossis occipitalis narrowed gradually is formed among both of a contact condition. In contact with this roll, a printing cylinder (9) is arranged under the ink attachment roll (1), popularity is won under this printing cylinder (9), and a roll (91) is arranged. ink supplies the above-mentioned ink reservoir section (11) from the combination nozzle (4) which performs supply of ink which carries out a postscript, recovery, supply of a penetrant remover, and recovery of washing waste fluid -- having -- a liquid level sensor (not shown) -- therefore, an oil level is controlled by setting height. It prints on the corrugated paper sheet S which it extracts as an ink attachment roll (1), and a roll (2) rotates in the direction which extracts the ink of the ink reservoir section (11) mutually, and the ink of an ink attachment roll (1) front face transfers to the printing die for corrugated fibreboard (not shown) on a printing cylinder (9), wins popularity with a printing cylinder (9), and is supplied between rolls (91) so that it may be well-known.

[0012] The detailed irregularity from which an ink attachment roll (1) serves as ink \*\*\*\*\* on the front face of hard rolls, such as a ceramic roll and a plating roll, is formed. As for the drawing roll (2), the front face is formed with rubber. Although the overall length of both rolls (1) and (2) changes with size of a printing machine, they are 1.5-4.7m. The weir member (12) which plugs up the edge of said ink reservoir section (11), and (12) are pressed against the both ends of both rolls (1) and (2).

[0013] As shown in Myst room (60) drawing 3 , both rolls (1), (2), and a weir member (12) are covered with covering (6), and the Myst room (60) is formed between a diaphragm roll (2) and covering (6). Covering (6) is formed in the case which holds both rolls (1) and (2). To a crown plate (65) Corresponding to said ink reservoir section (11), opening for transit (61) of a combination nozzle (4) is established in a correspondence location with the ink reservoir section ~~(11), and opening for printing cylinder invasion (62) for the printing die for corrugated~~ fibreboard by which the inferior surface of tongue was attached in the printing cylinder (9) to contact an ink attachment roll (1) is established. It is crooked in an ink attachment roll (1) side in the slanting upper part exceeding the ink reservoir section (11), and a tip edge covers an overall length, and the bottom plate (63) by the side of the drawing roll (2) of covering approaches an ink attachment roll (1), is plugged up, and has the plate (63a).

[0014] The top face of covering (6) is approaching the ink attachment roll (1) and the diaphragm roll (2), and the Myst room (60) as for which a slit-like slit (66) and (67) carried out opening to the diaphragm roll (2) and the ink attachment roll (1) is formed between a diaphragm roll (2) and

covering (6). Two or more sets (21) of 1 or fine misty injection nozzles are arranged in the above-mentioned Myst room (60). A fine misty injection nozzle (21) is for making the particle of liquid adhere in the shape of a thin film, and soaking it in thinner and an example positively on a diaphragm roll (2) front face, by injecting tap water in the shape of a fine fog, and maintaining the Myst room (60) to the high humidity near a saturation state, (\*\*\*\*\*). Grain size is 50 micrometers or less, and, as for fine fog, it is desirable to be referred to as 30 micrometers or less. A humidity sensor (68) is arranged in the Myst room (60), spraying and a spraying halt are controlled by this sensor, and the Myst room (60) is maintained by it by the high humidity near a saturation state or a saturation state.

[0015] Top-face opening (61) of covering (6) is penetrated, and the thinner supply nozzle (70) which supplements the edge side of the ink reservoir section (11) with thinner at this ink reservoir section (11) is arranged. Although thinner is tap water in the example, piping to a thinner supply nozzle (70) omits. A thinner supply nozzle (70) is \*\*\*\* even if it arranges the ink reservoir section (11) movable together with the following combination nozzle (4) at a longitudinal direction.

[0016] As shown in combination nozzle (4) drawing 2, along with the ink reservoir section (11), a slide base (41) is arranged above covering (6) possible [ horizontal migration ], and this slide base is coordinated with the slide driving gear (not shown) controlled by the control section (not shown). On the slide base (41), the combination nozzle (4) was attached through rise-and-fall driving gears (42), such as a pneumatic cylinder, and the ink reservoir section (11) is faced this nozzle lower limit. A combination nozzle (4) makes four roles of recovery of the washing waste fluid collected on the ink reservoir section (11) serve a double purpose like a postscript after supply of the penetrant remover for washing supply of the ink to the ink reservoir section (11), recovery of the ink from the ink reservoir section (11), said roll (1) of two, and (2), and washing. Said rise-and-fall driving gear (42) can change a combination nozzle (4) to three steps, a rise location, a middle height location, and a downward location. The lower limit of the combination nozzle (4) of a rise location is an upper location for a while from the setting oil-level height of the ink in the ink reservoir section (11). The lower limit of the combination nozzle (4) of the mid-position is located in a location somewhat lower than the setting height of an ink oil level. The lower limit of the combination nozzle (4) of a downward location invades into the deepest part of the ink reservoir section (11) to extent which is not barely bit between a roll (1) and (2). Corresponding to the bottom configuration of the ink reservoir section (11), the field by the side of both rolls (1) and (2) is omitted aslant, and the lower limit of a combination nozzle (4) is sharp in the wedge shape.

[0017] A combination nozzle (4) is connected to a flow conduit (44). A flow conduit (44) ~~consists of a vertical pipe (44a) which goes to the lower part from the upper part on the outside~~ of the flexible tube (44b) of the section from a combination nozzle (4) to the side attachment wall of a unit frame (100), and the side attachment wall of a unit frame (100). A flexible tube (44b) is die length with the allowances corresponding to the migration stroke of a combination nozzle (4). The bore of a vertical pipe (44a) and a flexible tube (44b) is an about 8-10mm capillary. A fin is 1/4 or less for a diameter compared with the bore of 40mm of the duct of the conventional aquosity quick-drying-ink circuit system. The lower limit of the above-mentioned vertical pipe (44a) is alternatively connected to an ink tank (31) and a waste fluid recovery tank (5) through a change-over valve (45). It puts on the side-attachment-wall lower limit of a unit

frame (100), a base (101) protrudes outward, and the sealing box (3) and waste fluid recovery tank (5) which hold an ink tank (31) in this \*\*\*\*\* (101) are arranged.

[0018] A sealing box (3) and an ink tank (31) sealing box (3) are the main parts for ink supply and recovery, and have held the ink tank (31) in the interior possible [ drawing ]. A sealing box (3) can open and close a top cover (30), and the penetration stoma (32) is established in the center of this top cover (30). An ink tank (31) removes the lid of the container for ink sale, and guidance tubing (33) which soaked the lower limit in this ink tank (31) penetrates the penetration ~~stoma (32) of a sealing box (3) airtightly, and it is connected to said change-over valve (45) removable.~~

[0019] By connecting the siphon for reduced pressure (35), and the Ayr supply pipe for pressurization (35a) to a sealing box (3), and sending in pressure air in a sealing box (3) from the Ayr supply pipe for pressurization (35a) The pressure in a sealing box (3) is heightened, the ink in an ink tank (31) is extruded, and ink can be supplied to the ink reservoir section (11) from a combination nozzle (4) through guidance tubing (33), a change-over valve (45), and a flow conduit (44). By attracting the air in a sealing box (3) by the siphon for reduced pressure (35), and decompressing the inside of a sealing box (3), a suction force is made to act on a combination nozzle (4), and the suction recovery of the ink of the ink reservoir section (11) can be carried out in a path contrary to the above at an ink tank (31). In the example, by the common following Ayr circuit (40), the siphon for reduced pressure (35) and the Ayr supply pipe for pressurization (35a) are one set (42) of a compressor, and can switch the inside of a sealing box (3) to pressurization and reduced pressure.

[0020] As shown in Ayr circuit (40) drawing 4 for pressurization and reduced pressure, the Ayr circuit (40) branches and forms the 1st and 2nd passage (400a) (400b) from a compressor (42). The 1st passage (400a) is branched and connected with a sealing box (3) with reduced pressure and pressurization common tubing (35), and joins the 2nd passage (400b) through an ejector (vacuum generator) (406). An ejector (406) is a well-known thing which the 1st passage (400a) side is attracted [ thing ] and generates a vacuum by feeding the compressed air into this ejector from the 2nd passage (400b). From the above-mentioned ejector (406), the 3rd passage (400c) extends on extension of the 2nd passage (400b), and it is wide opened by atmospheric air through the silencer (407). The change-over valve (408) is prepared in the 1st passage (400a) sequentially from the upstream between the tee (400d) to a sealing box (3), and the compressor (42) at the change-over valve (401), reducing-valve (402), change-over valve (403), and ejector (406) side. The upstream and a downstream change-over valve (401) (408) are solenoid valves which can be switched to open and close, and a middle change-over valve (403) is a solenoid valve which can be switched to open, close, and atmospheric-air disconnection. An open and ~~close change-over valve (404) is prepared in the upstream, and the reducing-valve (405) is~~ prepared in the 2nd passage (400b) at the downstream.

[0021] At the time of the pressurization to a sealing box (3), the change-over valve (408) of the downstream of the 1st passage (400a) and the change-over valve (404) of the 2nd passage (400b) are closed, and it opens the upstream and the middle change-over valve (401) (403) of the 1st passage (400a). As an arrow head A shows, the high-speed airstream from a compressor (42) flows in a sealing box (3) through a pressure reducing pressure control valve (402) and the Ayr supply pipe for pressurization (35a), and pressurizes the inside of a sealing box (3). At the time of reduced pressure, the change-over valve (408) of the downstream of the 1st passage (400a)



and the change-over valve (404) of the 2nd passage (400b) are opened, and it closes the upstream and the middle change-over valve (401) (403) of the 1st passage (400a). As an arrow head B shows the high-speed air from a compressor (42), it flows from the 2nd passage (400b) to the 3rd passage (400c) and an arrow head C shows, the flow of the air from a sealing box (3) side to the 3rd passage (400c) arises, and the inside of a shut-in pressure container (2) serves as negative pressure. In case high-speed airstream is emitted to atmospheric air from the 3rd path (400c), in order to pass a silencer (407), an air emission sound becomes low and does not emit the noise. In addition, the above-mentioned Ayr circuit (40) is not passed to what showed an example for switching the inside of a sealing-box (3) to pressurization and reduced pressure, but of course, it is not what is restricted to the above-mentioned example, and, as for the Ayr circuit, it is natural that it is so desirable that the change of pressurization and reduced pressure can be performed quickly.

[0022] It connects with said change-over valve (45) through an inhalant canal (51), and the waste fluid recovery tank (5) waste-fluid recovery tank (5) has the exhaust port (53) with a sluice valve (54) at the pars basilaris ossis occipitalis. The Ayr circuit (50) is coordinated with a waste fluid recovery tank (5) through \*\*\*\*\* (52). The Ayr circuit (50) can switch the inside of a waste fluid recovery tank (5) as well as the Ayr circuit (40) by the side of said sealing box (3) to reduced pressure and pressurization. However, the compressors (42) of the Ayr circuit (50) by the side of a waste fluid recovery tank (5) are the compressor of the Ayr circuit (40) by the side of a sealing box (3), and common use, are change-overs of a change-over valve (409), and operate two Ayr circuits (40) and (50) alternatively by one set (42) of a compressor. Like a postscript, a waste fluid recovery tank (5) collects the washing waste fluid collected on the ink reservoir section (11), does not open and discharge a sluice valve (54), and does not pressurize the inside of a waste fluid recovery tank (5), but, as for discharge of washing waste fluid, is made by \*\*. Therefore, it is not indispensable to give the function which pressurizes the inside of a waste fluid recovery tank (5) to the Ayr circuit (50). In case washing waste fluid is discharged from a waste fluid recovery tank (5), if the inside of this tank is pressurized, there is an advantage on which discharge time amount is shortened.

[0023] Penetrant remover supply pipe (7) A change-over valve (45) is approached and a penetrant remover supply pipe (7) is connected to the flow conduit (44) which goes to a combination nozzle (4) from said change-over valve (45). In the example, a penetrant remover is tap water, connects waterworks piping to a flow conduit (44) through a sluice valve (71), and is making with the penetrant remover supply pipe (7).

[0024] The ink viscosity detection means (8) is arranged by the ink viscosity detection means (8) flow conduit (44) in the combination nozzle (4) side from the penetrant remover supply pipe (7).

~~An ink viscosity detection means (8) arranges an ink-reservoir smallness-pot (81) near the flow conduit (44), and connects ink return tubing (83) to this pot (81) from a pot (81) from a flow conduit (44) at an ink supply pipe (82) and a flow conduit (44). A sluice valve (84) and (85) are prepared in an ink supply pipe (82) and ink return tubing (83), respectively. The ZAN cup (86) is relatively arranged in the vertical direction movable to the pot (81) by the pot (81). Actuation of a sluice valve (84) and (85) detects the ink which the ZAN cup (86) which accumulated ink in the pot (81) and was soaked in the pot (81) is relatively raised to a pot (81), and hangs down and falls from the stoma of the base of a ZAN cup (86) to a pot (81) with a detector (86a) (86b), and the viscosity of ink is measured by the time amount to lappet omission termination.~~

Measurement of ink viscosity is periodically performed to desired timing during printing operation. If ink viscosity becomes higher than a setup, according to delivery, and the amount used and the amount of supply of ink, a signal in the range in which the ink in the ink reservoir section (11) does not thin too much to a control section (not shown) the ink reservoir section (11) from said thinner supply nozzle (70) -- or thinner is supplied in an ink tank (31) from the thinner delivery pipe (not shown) which penetrates a sealing box (3) airtightly and leads to an ink tank (31).

~~[0025] Ink recovery / washing waste fluid recovery mode and the slide driving gear (not shown)~~ of the ink circulation mode aforementioned combination nozzle (4) are switchable at least in ink recovery / washing waste fluid recovery mode and the two modes in ink circulation mode. ink recovery and penetrant remover recovery mode -- a combination nozzle (4) -- the overall length of the ink reservoir section (11) -- continuing -- 1 -- or multiple-times round trip transit is carried out. It is made to move to the end of the ink reservoir section (11), and ink circulation mode is made to slide to the central site of the ink reservoir section (11) about 50cm in the predetermined section and the example from this migration location, as it is the mode under printing operation and it is shown in drawing 5 A, and the combination nozzle (4) which was standing by in the center section of the ink reservoir section (11) is shown in drawing 5 B. Next, a sealing box (3) is moved to the other end of the ink reservoir section (11), and the central site of the ink reservoir section (11) is made to carry out a predetermined section slide from this migration location, as shown in drawing 5 C. Next, it is made to move in the center of the ink reservoir section (11), and a sealing box (3) is made to suspend here in the location and example which are distant from this slide section. This cycle is repeated during printing operation. A combination nozzle (4) stands by in the center of the die-length direction of the ink reservoir section (11) at the time of termination of the two above-mentioned operation modes.

[0026] Next, ink supply in the empty ink reservoir section (11), actuation of the combination nozzle under printing operation (4), washing of the roll (1) accompanying a color substitute of ink and (2), and exchange of an ink tank (31) are explained.

[0027] In order to supply ink to the ink reservoir section (11) of ink supply sky, the inside of a sealing box (3) is pressurized by work of the Ayr circuit (40), and the combination nozzle (4) of a rise location is made to slide along with the ink reservoir section (11) with a slide driving gear (not shown). The ink extruded from the ink tank (31) is discharged by the ink reservoir section (11) from a combination nozzle (4). At this time, an ink attachment roll (1) and a diaphragm roll (2) are rotated, while preventing that the line of an ink oil level adheres to a roll (1) and (2), a stimulus is given to ink and the stirring effectiveness is acquired. If ink is supplied to setting oil-level height, ink supply will be suspended by work of a liquid level sensor, and a combination ~~nozzle (4) will once return in the center of the ink reservoir section (11) (-drawing 5 A).~~

[0028] If the ink attachment roll (1) of operation and diaphragm roll (2) of a combination nozzle (4) of printing operation are rotated and printing operation is started, the program included in the control section (not shown) will perform the following actuation. A nozzle (4) moves to near the end side of the ink reservoir section (11), descends to a middle height location, and soaks a tip in ink \*\*\*\*\* (11). A nozzle (4) moves to the central site of the ink reservoir section (11) about 50cm from the migration location. A sealing box (3) is made into negative pressure between this 50cm migration, and suction recovery of the ink of the ink reservoir section (11) is carried out at an ink tank (31) ( drawing 5 B). If a combination nozzle (4) carries out suction recovery of the

ink in the recovery section of the edge of the ink reservoir section (11), the oil level of this recovery section will fall, ink will move to the recovery section from the central site of the ink reservoir section (11), and the flow of ink will arise.

[0029] Next, suction recovery of ink is suspended, a nozzle (4) is raised, and it is made to move to the edge of the opposite side of the ink reservoir section (11). Horizontal migration is carried out, only said same section dropping a nozzle (4) from the migration location to a middle height location, and carrying out suction recovery of the ink. It is made said this appearance, the oil level of this recovery section falls, ink moves from the central site of the ink reservoir section (11), and the flow of ink arises in the ink reservoir section (11).

[0030] Next, where suction recovery of ink is suspended, a nozzle (4) rise is carried out, it is made to move to the location distant from the suction recovery location, and in the example, it is made to move to the center section of the ink reservoir section (11), a sealing box (3) is pressurized in the location, and ink is supplied to the ink reservoir section (11) from a nozzle (4). With a liquid level sensor, an oil level does not become more than setting height. During printing operation, the above-mentioned cycle is repeated and ink is circulated between the ink reservoir section (11) and an ink tank (31).

[0031] In order to perform an ink recovery ink substitute, the residual ink of the ink reservoir section (11) is collected. Rotation of a roll (1) and (2) is suspended and a combination nozzle (4) is dropped to the deepest location of the ink reservoir section (11) with a rise-and-fall driving gear (42). Rotation of a roll (1) and (2) is suspended for preventing a bite lump of the combination nozzle (4) of a between [ rolls ] and (5). Suction recovery of the ink in the reservoir section (11) is carried out making a combination nozzle (4) slide. Since it is the method which carries out suction recovery of the ink by vacuum pressure, if the overall length of the ink reservoir section (11) is covered and a combination nozzle (4) is made to go once or twice, the suction recovery of the ink of almost all the amounts in the ink reservoir section (11) can be carried out. Moreover, the ink which remains in the shape of ultra-thin film in the flow conduit (44) inside from a combination nozzle (4) to a change-over valve (45) is a minute amount very much.

[0032] A roll washing change-over valve (45) is switched, and a flow conduit (44) is intercepted with a sealing box (3) and a waste fluid recovery tank (5). Where a combination nozzle (4) is raised, a roll (1) and (2) are rotated. The sluice valve (71) of a penetrant remover supply pipe (7) is opened, and a penetrant remover is supplied to the ink reservoir section (11) from a combination nozzle (4). Since a penetrant remover is emitted from a combination nozzle (4) through a flow conduit (44), the inside of a flow conduit (44) is washed. Most ink which had adhered to a roll (1) and (2) in the shape of a thin film is flushed by rotation of a roll (1) and (2), and the reservoir section (11) itself is washed. Since the amount of ink which remains on the wall surface of the ink which has adhered to the ink attachment roll (1) in the shape of a thin film, and the ink reservoir section (11) is a minute amount and ink is aqueous, the amounts of the penetrant remover which washing takes are few, and end.

[0033] Rotation of a roll (1) and (2) is suspended, a combination nozzle (4) is descended to the deepest location of the ink reservoir section (11), and a waste fluid recovery tank (5) is decompressed by a change and the Ayr circuit (50) so that a change-over valve (45) may be opened for free passage on a waste fluid recovery tank (5) in this condition. A suction force acts on a combination nozzle (4), and the washing waste fluid in the ink reservoir section (11) is

collected from a combination nozzle (4) by the waste fluid recovery tank (5). Since washing waste fluid branches and flows for an ink viscosity detection means (8) from a flow conduit (44), it returns to a flow conduit (44) again and it is collected by the waste fluid recovery tank (5) by opening both the sluice valves (84) of the ink supply pipe (82) of an ink viscosity detection means (8), and ink return tubing (83), and (85) at this time, washing of an ink viscosity detection means (8) is also performed. Like the above, in the case of an ink substitute, the penetrant remover which ink recovery can make a loss there be nothing and washing of a roll takes in connection with it is little, it ends, and since the concentration of washing waste fluid is also low, the large-scale facility for processing of washing waste fluid is not almost needed, but run NINGUKOSU for waste fluid processing can be stopped.

[0034] While the exchange sealing box (3) of an ink tank is intercepted by the change-over valve (45) with the flow conduit (44), an ink tongue (31) is exchanged. This is performed including guidance tubing (33) connected not only to an ink tank (31) but to a change-over valve (45). Guidance tubing (33) is extracted and removed from the penetration stoma (32) of a sealing box (3). When the sealing box (3) is established in the low location like the example, receipts and payments of an upper aperture, then an ink tank (31) are convenient in a sealing box (3). Although closing motion of the lid (30) of a sealing box (3) and guidance tubing (33) extract, and it removes and a change-over valve (45) becomes obstructive in drawing 2 and drawing 4 at the receipts and payments of an ink tank (31) to a sealing box (3) It considers as the physical relationship which does not become obstructive mutually, and is convenient to exchange of flexible tubing then guidance tubing (33), and an ink tank (31) in a part or the whole of guidance tubing (33). If an ink tank (31) and guidance tubing (33) are exchanged and guidance tubing (33) is connected to a change-over valve (45), a change-over valve (45) is again switched to an ink tank (31) side, and it is made said this appearance, and by work of the Ayr circuit (40), a sealing box (3) will be pressurized and ink will be supplied to the ink reservoir section (11).

[0035] under the work above-mentioned ink supply of the Myst room (60), and printing operation -- a fine misty injection nozzle (21) and (21) to thinner -- injecting -- extracting -- a roll (2) front face -- the particle of thinner -- covering -- positive -- soaking (it being made to become wet) -- the Myst room (60) is made full of fine fog Since the Myst room (60) is maintained for fine fog by the high humidity near a saturation state, by rotation of a diaphragm roll (2), the particle of wrap thinner follows the ink reservoir section (11), and a roll surface is carried in. When ink thinner is directly dropped at the ink reservoir section (11), the specific gravity of thinner and ink, By soaking a diaphragm roll (2) peripheral surface in the particle of thinner in the shape of a thin film, and carrying this \*\*\*\* into the ink reservoir section (11) by rotation of a roll, although thinner does not immediately get used to ink but it is hard to be mixed by difference of properties, such as viscosity The moisture for which a drawing roll (2) front face gets wet gets used immediately with the ink of the ink reservoir section (11), and does not produce spots in the viscosity of skillful \*\*\*\*\* and ink. By extracting a fine misty injection nozzle (21) and (21), leaning a few to this roll side, and arranging in the lower part of a roll (2), it is effective in extracting much more positively and wetting the front face of a roll (2). Moreover, in order that the fine fog which escapes from the narrow outlet (66) of the drawing roll (2) upper part of the Myst room (60) may make it a highly humid ambient atmosphere near the ink reservoir section (11), moisture evaporation of the ink reservoir section (11) is suppressed, and a viscosity rise of ink is prevented.

[0036] the effectiveness of an example -- as mentioned above, in order to exchange an ink tank (31) and guidance tubing (33) as one set in the case of exchange of ink, the ink which adhered in the shape of [ thin to the inside of guidance tubing (33) ] film is not mixed with the ink of the following ink tank. Moreover, since a penetrant remover and washing waste fluid flow, it is not necessary to wash this duct to the flow conduit (44) to the change-over valve (45) containing a combination nozzle (4) separately, and to exchange this duct for it at every color substitute of ink in the case of roll washing. Therefore, it pulls out to the outside of printing of a duct, a sealing box (3) is arranged on the outside of a printing machine, and it becomes possible to exchange an ink tank on the outside of a printing machine. Since the sealing box (3) has been arranged near the installation floor line of a printing machine, it can exchange without lifting an ink tank highly. It is not necessary to make a \*\*\*\*\* printing unit estrange for exchange of an ink tank. Since supply and recovery of ink, penetrant remover supply, and recovery of washing waste fluid are performed with a common nozzle, it can carry out simple [ of the piping ].

[0037] In addition, although the penetrant remover supply pipe (7) was connected to the flow conduit (44) which is the recovery way of supply of ink, recovery, and washing waste fluid in the example, a penetrant remover can also be made directly dropped at an ink attachment roll (1), and supply of a penetrant remover is considered as another piping in this case. A penetrant remover does not pass a flow conduit (44), and as for \*\*, since the ink which passes a flow conduit (44) and in which excelling had also adhered to the inside of a flow conduit (44) is flushed, a problem does not have washing waste fluid.

[0038] Although a penetrant remover will be directly supplied to the empty ink reservoir section (11) from a combination nozzle (4) like an example if a penetrant remover is supplied from a combination nozzle (4). An include-angle adjusting device or the migration equipment (neither is illustrated) by the side of an ink attachment roll (1) can be coordinated with a combination nozzle (4), a penetrant remover can be directly dropped at an ink attachment roll (1) from a combination nozzle (4), and irregularity with the detailed front face of an ink attachment roll can also be flushed effectively.

[0039] Although ink was collected in the above-mentioned example in the ink circulation cycle by the ink recovery and ink supply under printing operation which are shown in drawing 3, carrying out fixed section transit of the edge of the ink reservoir section (11) with a combination nozzle (4). Even if it carries out suction recovery of the combination nozzle (4) according to a idle state by the edge side of an ink attachment roll (1), it is not necessary to necessarily carry out fixed section transit of the combination nozzle (4) in suction recovery of the ink in \*\*\*\* and an ink circulation cycle.

[0040] Moreover, although it extracted as converging section material (20) which extracts the ink on an ink attachment roll (1) and the roll (2) was used in the above-mentioned example, as it is not limited to this and shown in drawing 6, the overall length of this roll can be covered to an ink attachment roll (1), press contact of the band-like plate (22) can be carried out, and the ink reservoir section (11) can also be formed among both.

[0041] Of course, a rate of drying can also be carried out also to good glycol system ink not only by water color ink but by hypoviscosity, this invention is not limited to the configuration of the above-mentioned example, and various modification is possible for it in the range of a publication to a claim.

## TECHNICAL FIELD

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[Field of the Invention] This invention performs supply of ink, recovery, and recovery of washing waste fluid with a common nozzle, and relates to the printing machine which has arranged the tank of ink on the outside of a printing machine, and made exchange of an ink tank easy.

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## ~~PRIOR ART~~

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[Description of the Prior Art] There are what uses water color ink quick-drying by hypoviscosity like flexographic printing, and a method which uses the ink of \*\*\*\*\* by hyperviscosity like PURISURO printing in printing of a corrugated paper sheet. If the ink of hypoviscosity is not made to flow, in order that it may carry out a viscosity rise for a short time, As shown in drawing 7, ink is supplied to the ink reservoir section (11) which made the ink attachment roll (1) and this ink attachment roll carry out press contact and which extracts and is formed between rolls (2). A saucer (500) (500) is made to carry out an ink outflow from the both ends of the ink reservoir section (11). Ink is returned to an ink tank (502) through an ink return line (501) from a saucer (500). The ink in an ink tank (502) is sucked up with a pump (503), said ink reservoir section (11) is supplied through an ink supply pipe (504), it carries out in this way, ink is circulated, and the viscosity rise of ink is suppressed.

[0003] The penetrant remover for washing a roll (1) and (2) in the case of a color substitute of ink is supplied to the ink reservoir section (11) through an ink supply pipe (504) from the penetrant remover supply pipe (507) linked to the above-mentioned ink supply pipe (504), and washing of a roll is performed by rotation of a roll (1) and (2). Washing waste fluid is collected from an ink return pipe (501) by the waste fluid recovery tank (506) through a change-over valve (505). In the above-mentioned case, as for the circulation duct of ink, an ink supply pipe (504) and an ink return pipe (501) are needed, and it long-picture-izes, and since recovery of ink is self-weight fall of the ink in a duct, it needs to make a duct thick to about 40mm, and needs to collect ink smoothly. When the duct where ink circulates becomes thick for a long time, in case it is a color substitute of ink, the amount of the ink which adheres and remains in a duct inside, without the ability collecting increases with a natural thing. Moreover, there will also be many amounts of ink which remain adhered to a saucer (500) (500), and ink will be consumed vainly. Moreover, in order to have washed away together on the occasion of roll washing of the ink which adhered to the inside of a duct, or a saucer so much, a lot of penetrant removers were needed and there was also a problem of waste fluid processing.

~~[0004] Then, the applicant proposed the printing machine which pressurizes the inside of an ink tank, supplies and decompresses ink before in the printing machine which uses the ink of hypoviscosity, and collects ink (patent No. 3009354). The above-mentioned printing machine supplies the ink of an ink tank from a nozzle to the ink reservoir section, and collects the residual ink of the ink reservoir section on an ink tank by making an ink tank into negative pressure in the case of a color substitute of ink by holding an ink tank in a sealing box, and an end's connecting to supply / recovery nozzle of ink the other end of the duct which penetrated this box airtightly and reached the ink tank, and pressurizing the inside of a sealing box. Although the washing waste fluid which extracted as the ink attachment roll and washed the roll on the occasion of a~~

color substitute of ink collects on the ink reservoir section formed among both rolls, recovery of this washing waste fluid is performed for a nozzle and piping with the above-mentioned separate ink supply / recovery nozzle (refer to patent No. 2951637).

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## EFFECT OF THE INVENTION

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[Function and Effect] The ink in an ink tank (31) can be supplied to the ink reservoir section (11) ~~from a combination nozzle (4) by pressurizing the inside of a sealing box (3). The suction~~ ~~recovery of the ink of the ink reservoir section (11) can be carried out by decompressing the~~ inside of a sealing box (3) at an ink tank (31). Since it is suction recovery, even if the flow conduit (44) from the ink reservoir section (11) to a sealing box (3) is thin, it can collect ink in smooth and a short time. Moreover, since it is suction recovery, the amount of the ink which adheres in the shape of a thin film to a flow conduit (44) inside, and remains inside is a minute amount very much. Therefore, the penetrant remover which washing of a roll (1), (2), and the flow conduit (44) inside containing a combination nozzle (4) takes is little, and ends, and processing of washing waste fluid is also easy for it. This point differs from what must flush the ink which remains so much in an ink circuit by a lot of penetrant removers like [ in the ink recovery by self-weight fall of the ink in the thick duct in the conventional water-color-ink circuit system ] greatly.

[0008] The washing waste fluid which collected on the ink reservoir section (11) by roll washing is recoverable on this waste fluid recovery tank (5) by decompressing a waste fluid recovery tank (5). Washing waste fluid flows to the flow conduit (44) to the change-over valve (45) which contains a combination nozzle (4) in the case of roll washing, and the ink which has adhered to the inside of this flow conduit (44) in the shape of film thinly is also flushed. Furthermore, at the time of washing waste fluid recovery, the combination nozzle (4) is submerged in washing waste fluid, and even a nozzle tip peripheral face is flushed with waste fluid. For this reason, it is not necessary to wash separately from a roll a combination nozzle (4) and a flow conduit (44), and to exchange a combination nozzle (4) and a flow conduit (44) at every color substitute of ink. Therefore, this flow conduit (44) is pulled out to the outside of a printing machine, it considers as fixed piping, a sealing box (3) is arranged on the outside of a printing machine, and it is satisfactory for coordinating the ink tank (31) and flow conduit (44) in a sealing box (3).

[0009] Since an ink tank (31) is exchangeable on the outside of a printing machine, it becomes unnecessary to make a \*\*\*\*\* printing unit estrange for exchange of an ink tank. Therefore, also in printing operation, an ink tank can be exchanged, ink can be filled up one by one, and the operating ratio of a printing machine can be raised. It becomes unnecessary to make a \*\*\*\*\* ~~printing unit estrange also in the case of a color substitute of ink. Since the flow conduit (44)~~ which contains a combination nozzle (4) in the case of a color substitute of ink does not need to exchange, it can arrange for an ink substitute quickly also at this point. without it lifts an ink tank (31) highly by arranging a sealing box (3) near the installation floor line of a printing machine -- an ink tank -- being exchangeable . Since supply and recovery of ink, and recovery of washing waste fluid are performed with a common nozzle, it can carry out simple [ of the piping ].

[0010]

[Embodiment of the Invention] The schematic diagram 1 of a printing machine and a printing unit is a corrugated paper printing machine using water color ink with low viscosity, and this

printing machine has blanking ruled line equipment (300) which pierces two or more set [ of printing units ] U according to the feed equipment (200) which sends out one accumulated corrugated paper sheet at a time to a printing unit, and the color number of printing, and the printed sheet corresponding to a box configuration, and gives a ruled line corresponding to a bend line. Each printing unit U is arranged movable in a rail (102) (102) top, and it can open and close between \*\*\*\*\* printing units, and as shown in drawing 2 , during printing, it is closed between units and it can open between units in the case of exchange of a printing die for corrugated fibreboard, or a maintenance.

~~[0011] the frame (100) upper part of printing unit U -- an ink attachment roll (1) -- extracting -- a roll (2) -- relative -- contact -- it arranges possible [ alienation ] and the groove ink reservoir section (11) in which the pars basilaris ossis occipitalis narrowed gradually is formed among both of a contact condition. In contact with this roll, a printing cylinder (9) is arranged under the ink attachment roll (1), popularity is won under this printing cylinder (9), and a roll (91) is arranged. ink supplies the above-mentioned ink reservoir section (11) from the combination nozzle (4) which performs supply of ink which carries out a postscript, recovery, supply of a penetrant remover, and recovery of washing waste fluid -- having -- a liquid level sensor (not shown) -- therefore, an oil level is controlled by setting height. It prints on the corrugated paper sheet S which it extracts as an ink attachment roll (1), and a roll (2) rotates in the direction which extracts the ink of the ink reservoir section (11) mutually, and the ink of an ink attachment roll (1) front face transfers to the printing die for corrugated fibreboard (not shown) on a printing cylinder (9), wins popularity with a printing cylinder (9), and is supplied between rolls (91) so that it may be well-known.~~

[0012] The detailed irregularity from which an ink attachment roll (1) serves as ink \*\*\*\*\* on the front face of hard rolls, such as a ceramic roll and a plating roll, is formed. As for the drawing roll (2), the front face is formed with rubber. Although the overall length of both rolls (1) and (2) changes with size of a printing machine, they are 1.5-4.7m. The weir member (12) which plugs up the edge of said ink reservoir section (11), and (12) are pressed against the both ends of both rolls (1) and (2).

[0013] As shown in Myst room (60) drawing 3 , both rolls (1), (2), and a weir member (12) are covered with covering (6), and the Myst room (60) is formed between a diaphragm roll (2) and covering (6). Covering (6) is formed in the case which holds both rolls (1) and (2). To a crown plate (65) Corresponding to said ink reservoir section (11), opening for transit (61) of a combination nozzle (4) is established in a correspondence location with the ink reservoir section (11), and opening for printing cylinder invasion (62) for the printing die for corrugated fibreboard by which the inferior surface of tongue was attached in the printing cylinder (9) to ~~contact an ink attachment roll (1) is established. It is crooked in an ink attachment roll (1) side in the slanting upper part exceeding the ink reservoir section (11), and a tip edge covers an overall length, and the bottom plate (63) by the side of the drawing roll (2) of covering approaches an ink attachment roll (1), is plugged up, and has the plate (63a).~~

[0014] The top face of covering (6) is approaching the ink attachment roll (1) and the diaphragm roll (2), and the Myst room (60) as for which a slit-like slit (66) and (67) carried out opening to the diaphragm roll (2) and the ink attachment roll (1) is formed between a diaphragm roll (2) and covering (6). Two or more sets (21) of 1 or fine misty injection nozzles are arranged in the above-mentioned Myst room (60). A fine misty injection nozzle (21) is for making the particle of



liquid adhere in the shape of a thin film, and soaking it in thinner and an example positively on a diaphragm roll (2) front face, by injecting tap water in the shape of a fine fog, and maintaining the Myst room (60) to the high humidity near a saturation state, (\*\*\*\*\*). Grain size is 50 micrometers or less, and, as for fine fog, it is desirable to be referred to as 30 micrometers or less. A humidity sensor (68) is arranged in the Myst room (60), spraying and a spraying halt are controlled by this sensor, and the Myst room (60) is maintained by it by the high humidity near a saturation state or a saturation state.

~~[0015] Top-face opening (61) of covering (6) is penetrated, and the thinner supply nozzle (70) which supplements the edge side of the ink reservoir section (11) with thinner at this ink reservoir section (11) is arranged. Although thinner is tap water in the example, piping to a thinner supply nozzle (70) omits. A thinner supply nozzle (70) is \*\*\*\* even if it arranges the ink reservoir section (11) movable together with the following combination nozzle (4) at a longitudinal direction.~~

[0016] As shown in combination nozzle (4) drawing 2, along with the ink reservoir section (11), a slide base (41) is arranged above covering (6) possible [ horizontal migration ], and this slide base is coordinated with the slide driving gear (not shown) controlled by the control section (not shown). On the slide base (41), the combination nozzle (4) was attached through rise-and-fall driving gears (42), such as a pneumatic cylinder, and the ink reservoir section (11) is faced this nozzle lower limit. A combination nozzle (4) makes four roles of recovery of the washing waste fluid collected on the ink reservoir section (11) serve a double purpose like a postscript after supply of the penetrant remover for washing supply of the ink to the ink reservoir section (11), recovery of the ink from the ink reservoir section (11), said roll (1) of two, and (2), and washing. Said rise-and-fall driving gear (42) can change a combination nozzle (4) to three steps, a rise location, a middle height location, and a downward location. The lower limit of the combination nozzle (4) of a rise location is an upper location for a while from the setting oil-level height of the ink in the ink reservoir section (11). The lower limit of the combination nozzle (4) of the mid-position is located in a location somewhat lower than the setting height of an ink oil level. The lower limit of the combination nozzle (4) of a downward location invades into the deepest part of the ink reservoir section (11) to extent which is not barely bit between a roll (1) and (2). Corresponding to the bottom configuration of the ink reservoir section (11), the field by the side of both rolls (1) and (2) is omitted aslant, and the lower limit of a combination nozzle (4) is sharp in the wedge shape.

[0017] A combination nozzle (4) is connected to a flow conduit (44). A flow conduit (44) consists of a vertical pipe (44a) which goes to the lower part from the upper part on the outside of the flexible tube (44b) of the section from a combination nozzle (4) to the side attachment wall of a unit frame (100), and the side attachment wall of a unit frame (100). A flexible tube (44b) is die length with the allowances corresponding to the migration stroke of a combination nozzle (4). The bore of a vertical pipe (44a) and a flexible tube (44b) is an about 8-10mm capillary. A fin is 1/4 or less for a diameter compared with the bore of 40mm of the duct of the conventional aquosity quick-drying-ink circuit system. The lower limit of the above-mentioned vertical pipe (44a) is alternatively connected to an ink tank (31) and a waste fluid recovery tank (5) through a change-over valve (45). It puts on the side-attachment-wall lower limit of a unit frame (100), a base (101) protrudes outward, and the sealing box (3) and waste fluid recovery tank (5) which hold an ink tank (31) in this \*\*\*\*\* (101) are arranged.

[0018] A sealing box (3) and an ink tank (31) sealing box (3) are the main parts for ink supply and recovery, and have held the ink tank (31) in the interior possible [ drawing ]. A sealing box (3) can open and close a top cover (30), and the penetration stoma (32) is established in the center of this top cover (30). An ink tank (31) removes the lid of the container for ink sale, and guidance tubing (33) which soaked the lower limit in this ink tank (31) penetrates the penetration stoma (32) of a sealing box (3) airtightly, and it is connected to said change-over valve (45) removable.

~~[0019] By connecting the siphon for reduced pressure (35), and the Ayr supply pipe for pressurization (35a) to a sealing box (3), and sending in pressure air in a sealing box (3) from the Ayr supply pipe for pressurization (35a) The pressure in a sealing box (3) is heightened, the ink in an ink tank (31) is extruded, and ink can be supplied to the ink reservoir section (11) from a combination nozzle (4) through guidance tubing (33), a change-over valve (45), and a flow conduit (44). By attracting the air in a sealing box (3) by the siphon for reduced pressure (35), and decompressing the inside of a sealing box (3), a suction force is made to act on a combination nozzle (4), and the suction recovery of the ink of the ink reservoir section (11) can be carried out in a path contrary to the above at an ink tank (31). In the example, by the common following Ayr circuit (40), the siphon for reduced pressure (35) and the Ayr supply pipe for pressurization (35a) are one set (42) of a compressor, and can switch the inside of a sealing box (3) to pressurization and reduced pressure.~~

[0020] As shown in Ayr circuit (40) drawing 4 for pressurization and reduced pressure, the Ayr circuit (40) branches and forms the 1st and 2nd passage (400a) (400b) from a compressor (42). The 1st passage (400a) is branched and connected with a sealing box (3) with reduced pressure and pressurization common tubing (35), and joins the 2nd passage (400b) through an ejector (vacuum generator) (406). An ejector (406) is a well-known thing which the 1st passage (400a) side is attracted [ thing ] and generates a vacuum by feeding the compressed air into this ejector from the 2nd passage (400b). From the above-mentioned ejector (406), the 3rd passage (400c) extends on extension of the 2nd passage (400b), and it is wide opened by atmospheric air through the silencer (407). The change-over valve (408) is prepared in the 1st passage (400a) sequentially from the upstream between the tee (400d) to a sealing box (3), and the compressor (42) at the change-over valve (401), reducing-valve (402), change-over valve (403), and ejector (406) side. The upstream and a downstream change-over valve (401) (408) are solenoid valves which can be switched to open and close, and a middle change-over valve (403) is a solenoid valve which can be switched to open, close, and atmospheric-air disconnection. An open and close change-over valve (404) is prepared in the upstream, and the reducing valve (405) is prepared in the 2nd passage (400b) at the downstream.

~~[0021] At the time of the pressurization to a sealing box (3), the change-over valve (408) of the downstream of the 1st passage (400a) and the change-over valve (404) of the 2nd passage (400b) are closed, and it opens the upstream and the middle change-over valve (401) (403) of the 1st passage (400a). As an arrow head A shows, the high-speed airstream from a compressor (42) flows in a sealing box (3) through a pressure reducing pressure control valve (402) and the Ayr supply pipe for pressurization (35a), and pressurizes the inside of a sealing box (3). At the time of reduced pressure, the change-over valve (408) of the downstream of the 1st passage (400a) and the change-over valve (404) of the 2nd passage (400b) are opened, and it closes the upstream and the middle change-over valve (401) (403) of the 1st passage (400a). As an arrow head B~~

shows the high-speed air from a compressor (42), it flows from the 2nd passage (400b) to the 3rd passage (400c) and an arrow head C shows, the flow of the air from a sealing box (3) side to the 3rd passage (400c) arises, and the inside of a shut-in pressure container (2) serves as negative pressure. In case high-speed airstream is emitted to atmospheric air from the 3rd path (400c), in order to pass a silencer (407), an air emission sound becomes low and does not emit the noise. In addition, the above-mentioned Ayr circuit (40) is not passed to what showed an example for switching the inside of a sealing box (3) to pressurization and reduced pressure, but of course, it is not what is restricted to the above-mentioned example, and, as for the Ayr circuit, it is natural that it is so desirable that the change of pressurization and reduced pressure can be performed quickly.

[0022] It connects with said change-over valve (45) through an inhalant canal (51), and the waste fluid recovery tank (5) waste-fluid recovery tank (5) has the exhaust port (53) with a sluice valve (54) at the pars basilaris ossis occipitalis. The Ayr circuit (50) is coordinated with a waste fluid recovery tank (5) through \*\*\*\*\* (52). The Ayr circuit (50) can switch the inside of a waste fluid recovery tank (5) as well as the Ayr circuit (40) by the side of said sealing box (3) to reduced pressure and pressurization. However, the compressors (42) of the Ayr circuit (50) by the side of a waste fluid recovery tank (5) are the compressor of the Ayr circuit (40) by the side of a sealing box (3), and common use, are change-overs of a change-over valve (409), and operate two Ayr circuits (40) and (50) alternatively by one set (42) of a compressor. Like a postscript, a waste fluid recovery tank (5) collects the washing waste fluid collected on the ink reservoir section (11), does not open and discharge a sluice valve (54), and does not pressurize the inside of a waste fluid recovery tank (5), but, as for discharge of washing waste fluid, is made by \*\*. Therefore, it is not indispensable to give the function which pressurizes the inside of a waste fluid recovery tank (5) to the Ayr circuit (50). In case washing waste fluid is discharged from a waste fluid recovery tank (5), if the inside of this tank is pressurized, there is an advantage on which discharge time amount is shortened.

[0023] Penetrant remover supply pipe (7) A change-over valve (45) is approached and a penetrant remover supply pipe (7) is connected to the flow conduit (44) which goes to a combination nozzle (4) from said change-over valve (45). In the example, a penetrant remover is tap water, connects waterworks piping to a flow conduit (44) through a sluice valve (71), and is making with the penetrant remover supply pipe (7).

[0024] The ink viscosity detection means (8) is arranged by the ink viscosity detection means (8) flow conduit (44) in the combination nozzle (4) side from the penetrant remover supply pipe (7). An ink viscosity detection means (8) arranges an ink reservoir smallness pot (81) near the flow conduit (44), and connects ink return tubing (83) to this pot (81) from a pot (81) from a flow conduit (44) at an ink supply pipe (82) and a flow conduit (44). A sluice valve (84) and (85) are prepared in an ink supply pipe (82) and ink return tubing (83), respectively. The ZAN cup (86) is relatively arranged in the vertical direction movable to the pot (81) by the pot (81). Actuation of a sluice valve (84) and (85) detects the ink which the ZAN cup (86) which accumulated ink in the pot (81) and was soaked in the pot (81) is relatively raised to a pot (81), and hangs down and falls from the stoma of the base of a ZAN cup (86) to a pot (81) with a detector (86a) (86b), and the viscosity of ink is measured by the time amount to lappet omission termination.

Measurement of ink viscosity is periodically performed to desired timing during printing operation. If ink viscosity becomes higher than a setup, according to delivery, and the amount

used and the amount of supply of ink, a signal in the range in which the ink in the ink reservoir section (11) does not thin too much to a control section (not shown) the ink reservoir section (11) from said thinner supply nozzle (70) -- or thinner is supplied in an ink tank (31) from the thinner delivery pipe (not shown) which penetrates a sealing box (3) airtightly and leads to an ink tank (31).

[0025] Ink recovery / washing waste fluid recovery mode and the slide driving gear (not shown) of the ink circulation mode aforementioned combination nozzle (4) are switchable at least in ink recovery-/washing-waste-fluid-recovery-mode and the two modes in ink circulation mode. ink recovery-and-penetrant-remover-recovery-mode--a combination nozzle (4)-- the overall length of the ink reservoir section (11) -- continuing -- 1 -- or multiple-times round trip transit is carried out. It is made to move to the end of the ink reservoir section (11), and ink circulation mode is made to slide to the central site of the ink reservoir section (11) about 50cm in the predetermined section and the example from this migration location, as it is the mode under printing operation and it is shown in drawing 5 A, and the combination nozzle (4) which was standing by in the center section of the ink reservoir section (11) is shown in drawing 5 B. Next, a sealing box (3) is moved to the other end of the ink reservoir section (11), and the central site of the ink reservoir section (11) is made to carry out a predetermined section slide from this migration location, as shown in drawing 5 C. Next, it is made to move in the center of the ink reservoir section (11), and a sealing box (3) is made to suspend here in the location and example which are distant from this slide section. This cycle is repeated during printing operation. A combination nozzle (4) stands by in the center of the die-length direction of the ink reservoir section (11) at the time of termination of the two above-mentioned operation modes.

[0026] Next, ink supply in the empty ink reservoir section (11), actuation of the combination nozzle under printing operation (4), washing of the roll (1) accompanying a color substitute of ink and (2), and exchange of an ink tank (31) are explained.

[0027] In order to supply ink to the ink reservoir section (11) of ink supply sky, the inside of a sealing box (3) is pressurized by work of the Ayr circuit (40), and the combination nozzle (4) of a rise location is made to slide along with the ink reservoir section (11) with a slide driving gear (not shown). The ink extruded from the ink tank (31) is discharged by the ink reservoir section (11) from a combination nozzle (4). At this time, an ink attachment roll (1) and a diaphragm roll (2) are rotated, while preventing that the line of an ink oil level adheres to a roll (1) and (2), a stimulus is given to ink and the stirring effectiveness is acquired. If ink is supplied to setting oil-level height, ink supply will be suspended by work of a liquid level sensor, and a combination nozzle (4) will once return in the center of the ink reservoir section (11) ( drawing 5 A).

[0028] If the ink attachment roll (1) of operation and diaphragm roll (2) of a combination nozzle (4)-of-printing-operation-are-rotated-and-printing-operation-is-started, the program included in the control section (not shown) will perform the following actuation. A nozzle (4) moves to near the end side of the ink reservoir section (11), descends to a middle height location, and soaks a tip in ink \*\*\*\*\* (11). A nozzle (4) moves to the central site of the ink reservoir section (11) about 50cm from the migration location. A sealing box (3) is made into negative pressure between this 50cm migration, and suction recovery of the ink of the ink reservoir section (11) is carried out at an ink tank (31) ( drawing 5 B). If a combination nozzle (4) carries out suction recovery of the ink in the recovery section of the edge of the ink reservoir section (11), the oil level of this recovery section will fall, ink will move to the recovery section from the central site of the ink

reservoir section (11), and the flow of ink will arise.

[0029] Next, suction recovery of ink is suspended, a nozzle (4) is raised, and it is made to move to the edge of the opposite side of the ink reservoir section (11). Horizontal migration is carried out, only said same section dropping a nozzle (4) from the migration location to a middle height location, and carrying out suction recovery of the ink. It is made said this appearance, the oil level of this recovery section falls, ink moves from the central site of the ink reservoir section (11), and the flow of ink arises in the ink reservoir section (11).

~~[0030] Next, where suction recovery of ink is suspended, a nozzle (4) rise is carried out, it is made to move to the location distant from the suction recovery location, and in the example, it is made to move to the center section of the ink reservoir section (11), a sealing box (3) is pressurized in the location, and ink is supplied to the ink reservoir section (11) from a nozzle (4). With a liquid level sensor, an oil level does not become more than setting height. During printing operation, the above-mentioned cycle is repeated and ink is circulated between the ink reservoir section (11) and an ink tank (31).~~

[0031] In order to perform an ink recovery ink substitute, the residual ink of the ink reservoir section (11) is collected. Rotation of a roll (1) and (2) is suspended and a combination nozzle (4) is dropped to the deepest location of the ink reservoir section (11) with a rise-and-fall driving gear (42). Rotation of a roll (1) and (2) is suspended for preventing a bite lump of the combination nozzle (4) of a between [ rolls ] and (5). Suction recovery of the ink in the reservoir section (11) is carried out making a combination nozzle (4) slide. Since it is the method which carries out suction recovery of the ink by vacuum pressure, if the overall length of the ink reservoir section (11) is covered and a combination nozzle (4) is made to go once or twice, the suction recovery of the ink of almost all the amounts in the ink reservoir section (11) can be carried out. Moreover, the ink which remains in the shape of ultra-thin film in the flow conduit (44) inside from a combination nozzle (4) to a change-over valve (45) is a minute amount very much.

[0032] A roll washing change-over valve (45) is switched, and a flow conduit (44) is intercepted with a sealing box (3) and a waste fluid recovery tank (5). Where a combination nozzle (4) is raised, a roll (1) and (2) are rotated. The sluice valve (71) of a penetrant remover supply pipe (7) is opened, and a penetrant remover is supplied to the ink reservoir section (11) from a combination nozzle (4). Since a penetrant remover is emitted from a combination nozzle (4) through a flow conduit (44), the inside of a flow conduit (44) is washed. Most ink which had adhered to a roll (1) and (2) in the shape of a thin film is flushed by rotation of a roll (1) and (2), and the reservoir section (11) itself is washed. Since the amount of ink which remains on the wall surface of the ink which has adhered to the ink attachment roll (1) in the shape of a thin film, and ~~the ink reservoir section (11) is a minute amount and ink is aquosity, the amounts of the~~ penetrant remover which washing takes are few, and end.

[0033] Rotation of a roll (1) and (2) is suspended, a combination nozzle (4) is descended to the deepest location of the ink reservoir section (11), and a waste fluid recovery tank (5) is decompressed by a change and the Ayr circuit (50) so that a change-over valve (45) may be opened for free passage on a waste fluid recovery tank (5) in this condition. A suction force acts on a combination nozzle (4), and the washing waste fluid in the ink reservoir section (11) is collected from a combination nozzle (4) by the waste fluid recovery tank (5). Since washing waste fluid branches and flows for an ink viscosity detection means (8) from a flow conduit (44),

it returns to a flow conduit (44) again and it is collected by the waste fluid recovery tank (5) by opening both the sluice valves (84) of the ink supply pipe (82) of an ink viscosity detection means (8), and ink return tubing (83), and (85) at this time, washing of an ink viscosity detection means (8) is also performed. Like the above, in the case of an ink substitute, the penetrant remover which ink recovery can make a loss there be nothing and washing of a roll takes in connection with it is little, it ends, and since the concentration of washing waste fluid is also low, the large-scale facility for processing of washing waste fluid is not almost needed, but run NINGUKOSU for waste fluid processing can be stopped.

[0034] While the exchange sealing box (3) of an ink tank is intercepted by the change-over valve (45) with the flow conduit (44), an ink tongue (31) is exchanged. This is performed including guidance tubing (33) connected not only to an ink tank (31) but to a change-over valve (45). Guidance tubing (33) is extracted and removed from the penetration stoma (32) of a sealing box (3). When the sealing box (3) is established in the low location like the example, receipts and payments of an upper aperture, then an ink tank (31) are convenient in a sealing box (3). Although closing motion of the lid (30) of a sealing box (3) and guidance tubing (33) extract, and it removes and a change-over valve (45) becomes obstructive in drawing 2 and drawing 4 at the receipts and payments of an ink tank (31) to a sealing box (3) It considers as the physical relationship which does not become obstructive mutually, and is convenient to exchange of flexible tubing then guidance tubing (33), and an ink tank (31) in a part or the whole of guidance tubing (33). If an ink tank (31) and guidance tubing (33) are exchanged and guidance tubing (33) is connected to a change-over valve (45), a change-over valve (45) is again switched to an ink tank (31) side, and it is made said this appearance, and by work of the Ayr circuit (40), a sealing box (3) will be pressurized and ink will be supplied to the ink reservoir section (11).

[0035] under the work above-mentioned ink supply of the Myst room (60), and printing operation -- a fine misty injection nozzle (21) and (21) to thinner -- injecting -- extracting -- a roll (2) front face -- the particle of thinner -- covering -- positive -- soaking (it being made to become wet) -- the Myst room (60) is made full of fine fog Since the Myst room (60) is maintained for fine fog by the high humidity near a saturation state, by rotation of a diaphragm roll (2), the particle of wrap thinner follows the ink reservoir section (11), and a roll surface is carried in. When ink thinner is directly dropped at the ink reservoir section (11), the specific gravity of thinner and ink, By soaking a diaphragm roll (2) peripheral surface in the particle of thinner in the shape of a thin film, and carrying this \*\*\*\* into the ink reservoir section (11) by rotation of a roll, although thinner does not immediately get used to ink but it is hard to be mixed by difference of properties, such as viscosity The moisture for which a drawing roll (2) front face gets wet gets used immediately with the ink of the ink reservoir section (11), and does not produce spots in the viscosity of skillful \*\*\*\*\* and ink. By extracting a fine misty injection nozzle (21) and (21), leaning a few to this roll side, and arranging in the lower part of a roll (2), it is effective in extracting much more positively and wetting the front face of a roll (2). Moreover, in order that the fine fog which escapes from the narrow outlet (66) of the drawing roll (2) upper part of the Myst room (60) may make it a highly humid ambient atmosphere near the ink reservoir section (11), moisture evaporation of the ink reservoir section (11) is suppressed, and a viscosity rise of ink is prevented.

[0036] the effectiveness of an example -- as mentioned above, in order to exchange an ink tank (31) and guidance tubing (33) as one set in the case of exchange of ink, the ink which adhered in

the shape of [ thin to the inside of guidance tubing (33) ] film is not mixed with the ink of the following ink tank. Moreover, since a penetrant remover and washing waste fluid flow, it is not necessary to wash this duct to the flow conduit (44) to the change-over valve (45) containing a combination nozzle (4) separately, and to exchange this duct for it at every color substitute of ink in the case of roll washing. Therefore, it pulls out to the outside of printing of a duct, a sealing box (3) is arranged on the outside of a printing machine, and it becomes possible to exchange an ink tank on the outside of a printing machine. Since the sealing box (3) has been arranged near the installation floor line of a printing machine, it can exchange without lifting an ink tank.

~~highly. It is not necessary to make a \*\*\*\*\* printing unit estrange for exchange of an ink tank.~~

Since supply and recovery of ink, penetrant remover supply, and recovery of washing waste fluid are performed with a common nozzle, it can carry out simple [ of the piping ].

[0037] In addition, although the penetrant remover supply pipe (7) was connected to the flow conduit (44) which is the recovery way of supply of ink, recovery, and washing waste fluid in the example, a penetrant remover can also be made directly dropped at an ink attachment roll (1), and supply of a penetrant remover is considered as another piping in this case. A penetrant remover does not pass a flow conduit (44), and as for \*\*, since the ink which passes a flow conduit (44) and in which excelling had also adhered to the inside of a flow conduit (44) is flushed, a problem does not have washing waste fluid.

[0038] Although a penetrant remover will be directly supplied to the empty ink reservoir section (11) from a combination nozzle (4) like an example if a penetrant remover is supplied from a combination nozzle (4). An include-angle adjusting device or the migration equipment (neither is illustrated) by the side of an ink attachment roll (1) can be coordinated with a combination nozzle (4), a penetrant remover can be directly dropped at an ink attachment roll (1) from a combination nozzle (4), and irregularity with the detailed front face of an ink attachment roll can also be flushed effectively.

[0039] Although ink was collected in the above-mentioned example in the ink circulation cycle by the ink recovery and ink supply under printing operation which are shown in drawing 3, carrying out fixed section transit of the edge of the ink reservoir section (11) with a combination nozzle (4). Even if it carries out suction recovery of the combination nozzle (4) according to a idle state by the edge side of an ink attachment roll (1), it is not necessary to necessarily carry out fixed section transit of the combination nozzle (4) in suction recovery of the ink in \*\*\*\* and an ink circulation cycle.

[0040] Moreover, although it extracted as converging section material (20) which extracts the ink on an ink attachment roll (1) and the roll (2) was used in the above-mentioned example, as it is not limited to this and shown in drawing 6, the overall length of this roll can be covered to an ~~ink attachment roll (1), press contact of the band-like plate (22) can be carried out,~~ and the ink reservoir section (11) can also be formed among both.

[0041] Of course, a rate of drying can also be carried out also to good glycol system ink not only by water color ink but by hypoviscosity, this invention is not limited to the configuration of the above-mentioned example, and various modification is possible for it in the range of a publication to a claim.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] As mentioned above, piping increases that the passage of ink and washing waste fluid is another. Moreover, in order to solve the problem of washing of piping from ink supply / recovery nozzle to the ink tank in the case of a color substitute of ink, the sealing box in which an ink tank is held approaches the ink reservoir section, is arranged, the duct from an ink tank to a nozzle is shortened, and the duct which contains this nozzle in the case of exchange of an ink tank is also exchanged together. In a corrugated paper printing machine, a sealing box serves as a height location of about 1.5m from the installation floor line of a printing machine, considering the height location of the ink reservoir section. For this reason, for ink exchange, a heavy ink tank must be lifted to a sealing box, and it is troublesome. Moreover, charge workability has bad time and effort to removal of piping from an ink tank to a nozzle, and a positioning fixed activity. Furthermore, with the airline printer which put two or more printing units in order, at every exchange of an ink tank, an adjacent printing unit must be made to have to estrange, the workspace for exchange of an ink tank must be secured, and this is reducing the operating ratio of a printing machine according to the color of ink greatly. This invention clarifies the printing machine which can solve the above-mentioned problem.

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## MEANS

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[Means for Solving the Problem] The printing machine of this invention accumulates ink in the ink reservoir section (11) formed between the converging section material (20) which made the ink attachment roll (1) and this ink attachment roll carry out press contact, and is rotation of an ink attachment roll (1). In the printing machine which transfers the ink from an ink attachment roll (1) to the printing die for corrugated fibreboard attached in the printing cylinder (9) The ink reservoir section (11) is made to face the combination nozzle (4) which makes supply of ink, recovery, and recovery of roll washing waste fluid serve a double purpose. Said combination nozzle (4) is coordinated through a flow conduit (44) and a change-over valve (45) common to the ink tank (31) and waste fluid recovery tank (5) which were arranged on the outside of a printing machine. An ink tank (31) is held in a sealing box (3), the siphon for reduced pressure (35) and the Ayr supply pipe for pressurization (35a) are coordinated with this sealing box, the open air and cutoff are possible for a waste fluid recovery tank (5), and it is coordinated with the siphon for reduced pressure (51).

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the outline front view of a printing machine.

[Drawing 2] It is the slant-face Fig. which fractured some printing units.

[Drawing 3] It is a sectional view near the ink reservoir section of a printing unit.

[Drawing 4] It is the explanatory view of a sealing box, the duct of the ink supply to a waste fluid recovery tank, recovery, penetrant remover supply, and washing waste fluid recovery and pressurization, and a reduced pressure Ayr circuit.

[Drawing 5] It is the explanatory view of a combination nozzle of operation.

[Drawing 6] It is the sectional view of other examples of the converging section material to an



ink attachment roll.

[Drawing 7] It is the explanatory view of the circuit of conventional quick drying ink.

[Description of Notations]

(1) Ink attachment roll

(11) Ink reservoir section

(2) Drawing roll

(3) Sealing box

(31) Ink tank

(4) Nozzle

(5) Waste fluid recovery tank

[Translation done.]

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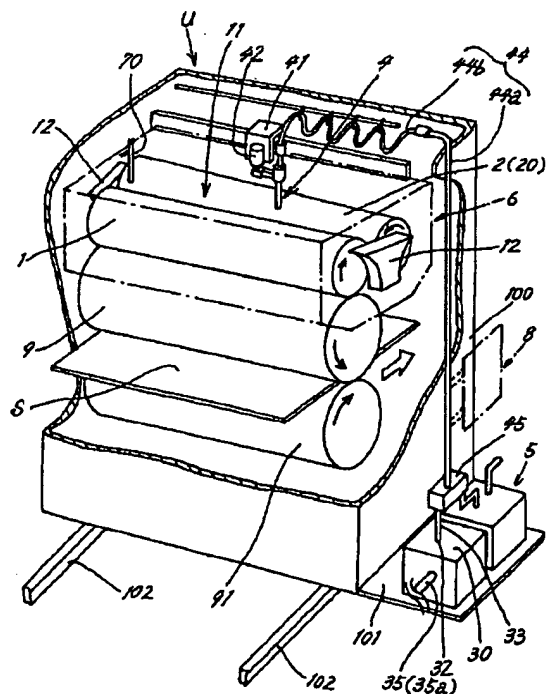
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(54)【発明の名称】 印刷機

(57)【要約】

【課題】 インキ交換を印刷機の外側から可能にする。

【解決する手段】 インキ付けロール1絞リロール2との間に形成されるインキ貯留部11を有し、インキの供給、回収、ロール洗浄液の供給及び洗浄廃液の回収を兼用する兼用ノズル4を、印刷機の外側に配備されたインキタンク31及び廃液回収タンク5に切換可能に連繋し、インキタンク31内を加圧することにより該タンク内のインキを兼用ノズル4から流通管44を通じてインキ貯留部11に供給し、インキタンクを負圧にすることによりインキ貯留部11のインキをインキタンク31に回収し、廃液回収タンク5内を負圧にすることにより、ロール洗浄によりインキ貯留部11に溜まった洗浄廃液を兼用ノズル4から流通管44を通じて廃液回収タンク5に回収できる印刷機。インキタンク31の交換を印刷機の外で行うことができる。



## 【特許請求の範囲】

【請求項1】 インキ付けロール(1)と該インキ付けロールに押圧接触させた絞り部材(20)との間に形成されるインキ貯留部(11)にインキを溜め、インキ付けロール(1)の回転により、版胴(9)に取り付けられた印版にインキ付けロール(1)からのインキを転移させる印刷機において、インキの供給、回収及びロール洗浄廃液の回収を兼用する兼用ノズル(4)をインキ貯留部(11)に臨ませ、印刷機の外側に配備されたインキタンク(31)及び廃液回収タンク(5)に共通の流通管(44)及び切換弁(45)を介して前記兼用ノズル(4)を連繋し、インキタンク(31)を密閉ボックス(3)に收容して該密閉ボックスに減圧用吸引管(35)と加圧用エア供給管(35a)を連繋し、廃液回収タンク(5)は外気と遮断可能であって減圧用吸引管(51)に連繋し、密閉ボックス(3)内を加圧することによりインキタンク(31)内のインキを兼用ノズル(4)から流通管(44)を通じてインキ貯留部(11)に供給し、密閉ボックス(3)内を負圧にすることによりインキ貯留部(11)のインキを流通管(44)を通じて兼用ノズル(4)からインキタンク(31)に回収し、廃液回収タンク(5)内を負圧にすることにより、ロール洗浄によりインキ貯留部(11)に溜まった洗浄廃液を兼用ノズル(4)から流通管(44)を通じて廃液回収タンク(5)に回収することを特徴とする印刷機。

【請求項2】 流通管(44)に洗浄液供給管(7)が連繋されて兼用ノズル(4)は洗浄液の供給も兼用する請求項1に記載の印刷機。

【請求項3】 兼用ノズル(4)は、インキ貯留部(11)に沿って横移動可能且つ昇降可能に配備されている請求項1又は2に記載の印刷機。

【請求項4】 インキタンク(31)から該インキタンク(31)とセットになった案内管(33)が密閉ボックス(3)を気密に貫通して切換弁(45)に着脱可能に接続されている請求項1乃至3の何れかに記載の印刷機。

【請求項5】 インキ貯留部(11)にインキを供給した後、兼用ノズル(4)をインキ貯留部(11)の一端側に移動させて所定量のインキを吸引回収して、インキ貯留部(11)内で該インキ回収部へのインキの流れを生じさせ、次に兼用ノズル(4)をインキ貯留部(11)の他端側へ移動させて前記同様にして所定量のインキを吸引回収することにより該インキ回収部へのインキの流れを生じさせ、次に兼用ノズル(4)を該インキ回収区間から離れた位置へ移動させてからインキ貯留部(11)にインキを供給し、印刷運転中は、上記インキ貯留部(11)の両端近辺でのインキ回収と、該回収部から離れた位置でのインキ供給のサイクルを繰り返すプログラムが組み込まれた請求項1乃至4の何れかに記載の印刷機。

【請求項6】 兼用ノズル(4)は、インキ貯留部(11)の端部からインキ貯留部(11)の中央側へ所定区間移動しながらインキを回収する請求項5に記載の印刷機。

【請求項7】 流通管(44)の途上にインキの粘度を計測するインキ粘度検出手段(8)が組み込まれている請求項1乃至6の何れかに記載の印刷機。

## 【発明の詳細な説明】

## 【0001】

【発明の属する分野】 本発明は、インキの供給、回収、洗浄廃液の回収を共通のノズルで行い、インキのタンクを印刷機の外側に配置してインキタンクの交換を容易にした印刷機に関するものである。

## 【0002】

【従来の技術】 段ボールシートの印刷には、フレキソ印刷の様に低粘度で速乾性の水性インキを使用するものと、プリスロ印刷の様に高粘度で遅乾性のインキを使用する方法がある。低粘度のインキは、流動させておかなければ短時間で粘度上昇するため、図7に示す如く、インキ付けロール(1)と該インキ付けロールに押圧接触させた絞りロール(2)との間に形成されるインキ貯留部(11)にインキを供給し、インキ貯留部(11)の両端から受け皿(500)(500)にインキ流出させ、受け皿(500)からインキ戻り管路(501)を通じてインキタンク(502)にインキを戻し、インキタンク(502)内のインキをポンプ(503)で吸い上げ、インキ供給管(504)を通じて前記インキ貯留部(11)に供給し、この様にしてインキを循環させてインキの粘度上昇を抑えている。

【0003】 インキの色替えの際に、ロール(1)(2)を洗浄するための洗浄液は、上記インキ供給管(504)に接続した洗浄液供給管(507)からインキ供給管(504)を通じてインキ貯留部(11)に供給され、ロール(1)(2)の回転によってロールの洗浄が行われる。洗浄廃液は、インキ戻り管(501)から切換弁(505)を介して廃液回収タンク(506)に回収される。上記の場合、インキの循環管路は、インキ供給管(504)とインキ戻り管(501)が必要となって長尺化し、又、インキの回収は管路内でのインキの自重落下であるから、管路を40mm程度に太くしてインキをスムーズに回収する必要がある。インキが流通する管路が長く、又、太くなると、インキの色替えの際に、回収しきれずに管路内面に付着して残存するインキの量は当然のことながら多くなる。又、受け皿(500)(500)に付着したまま残存するインキ量も多く、インキを無駄に消費してしまう。又、管路内や受け皿に多量に付着したインキをロール洗浄の際に一緒に洗い流すには、多量の洗浄液を必要とし、廃液処理の問題もあった。

【0004】 そこで、出願人は以前に、低粘度のインキを使用する印刷機において、インキタンク内を加圧してインキを供給し、減圧してインキを回収する印刷機を提案した(特許第3009354号)。上記印刷機は、インキタンクを密閉ボックスに收容し、一端が該ボックスを気密に貫通してインキタンクに達した管路の他端をインキの供給・回収ノズルに接続し、密閉ボックス内を加圧することにより、インキタンクのインキをノズルからイ

ンキ貯留部に供給し、インキの色替えの際には、インキタンクを負圧にすることによりインキ貯留部の残留インキをインキタンクに回収するものである。インキの色替えの際に、インキ付けロールと絞りロールを洗浄した洗浄廃液は、両ロールとの間に形成されるインキ貯留部に溜まるが、この洗浄廃液の回収は、上記インキ供給・回収ノズルとは別個のノズル及び配管で行っている(特許第2951637号参照)。

【0005】

【発明が解決しようとする課題】上記の様に、インキと洗浄廃液の流路が別であると、配管が増える。又、インキの色替えの際の、インキ供給・回収ノズルからインキタンクまでの配管の洗浄の問題を解決するために、インキタンクを収容する密閉ボックスは、インキ貯留部に接近して配備して、インキタンクからノズルまでの管路を短くし、インキタンクの交換の際に、該ノズルを含む管路も一緒に交換している。段ボール印刷機では、インキ貯留部の高さ位置からして、密閉ボックスは、印刷機の設置床面から約1.5mの高さ位置となる。このため、インキ交換のためには、重いインキタンクを密閉ボックスまで持ち上げねばならず面倒である。又、インキタンクからノズルに至る配管の取り外し及び位置決め固定作業に手間が掛かり作業性が悪い。更に、インキの色別に複数の印刷ユニットを並べた印刷装置では、インキタンクの交換の都度、隣り合う印刷ユニットを離間させてインキタンクの交換のための作業スペースを確保せねばならず、これが、印刷機の稼働率を大きく低下させている。本発明は上記問題を解決できる印刷機を明らかにするものである。

【0006】

【課題を解決する手段】本発明の印刷機は、インキ付けロール(1)と該インキ付けロールに押圧接触させた絞り部材(20)との間に形成されるインキ貯留部(11)にインキを溜め、インキ付けロール(1)の回転により、版胴(9)に取り付けられた印版にインキ付けロール(1)からのインキを転移させる印刷機において、インキの供給、回収及びロール洗浄廃液の回収を兼用する兼用ノズル(4)をインキ貯留部(11)に臨ませ、印刷機の外側に配備されたインキタンク(31)及び廃液回収タンク(5)に共通の流通管(44)及び切換弁(45)を介して前記兼用ノズル(4)を連繋し、インキタンク(31)を密閉ボックス(3)に収容して該密閉ボックスに減圧用吸引管(35)と加圧用エアー供給管(35a)を連繋し、廃液回収タンク(5)は外気と遮断可能であって減圧用吸引管(51)に連繋されている。

【0007】

【作用及び効果】密閉ボックス(3)内を加圧することによりインキタンク(31)内のインキを兼用ノズル(4)からインキ貯留部(11)に供給できる。密閉ボックス(3)内を減圧することによりインキ貯留部(11)のインキをインキタンク(31)に吸引回収できる。吸引回収であるからイン

キ貯留部(11)から、密閉ボックス(3)への流通管(44)は細くてもスムーズ且つ短時間でインキを回収できる。

又、吸引回収であるから、流通管(44)内面に薄膜状に付着して残存するインキの量は極めて微量である。そのため、ロール(1)(2)や、兼用ノズル(4)を含む流通管(44)内面の洗浄に要する洗浄液は少量で済み、洗浄廃液の処理も容易である。この点が、従来の水性インキ循環式に於ける太い管路内でのインキの自重落下によるインキ回収の場合の様に、インキ循環路に多量に残存するインキを多量の洗浄液で洗い流さなければならないものとは大きく異なる。

【0008】ロール洗浄によりインキ貯留部(11)に溜まった洗浄廃液は、廃液回収タンク(5)を減圧することにより、該廃液回収タンク(5)に回収できる。ロール洗浄の際に、兼用ノズル(4)を含む切換弁(45)までの流通管(44)に洗浄廃液が流れ、該流通管(44)の内面に薄膜状に付着しているインキも洗い流される。更に、洗浄廃液回収時、兼用ノズル(4)は洗浄廃液に浸かっており、ノズル先端外周面までもが廃液によって洗い流される。このため、兼用ノズル(4)及び流通管(44)をロールと別個に洗浄する必要はなく、インキの色替えの都度、兼用ノズル(4)及び流通管(44)を交換する必要はない。従って、該流通管(44)を印刷機の外側へ引き出して固定配管とし、密閉ボックス(3)を印刷機の外側に配置し、密閉ボックス(3)内のインキタンク(31)と流通管(44)を連繋することに問題はない。

【0009】インキタンク(31)を印刷機の外側で交換できるため、インキタンクの交換のために隣合う印刷ユニットを離間させる必要はなくなる。従って、印刷稼働中でもインキタンクを交換して順次インキを補充出来、印刷機の稼働率を高めることができる。インキの色替えの際も、隣合う印刷ユニットを離間させる必要はなくなる。インキの色替えの際に、兼用ノズル(4)を含む流通管(44)は交換せずに済むため、この点でも、インキ替えの段取りを迅速に行うことができる。密閉ボックス(3)を印刷機の設置床面近くに配置することにより、インキタンク(31)を高く持ち上げることなくインキタンクの交換できる。インキの供給・回収、洗浄廃液の回収を共通のノズルで行うため、配管が簡素できる。

【0010】

【発明の実施の形態】印刷機及び印刷ユニットの概略

図1は、粘度の低い水性インキを用いる段ボール印刷機であって、該印刷機は、積み重ねた段ボールシートを1枚ずつ印刷ユニットに送り出す給紙装置(200)、印刷の色数に応じた複数基の印刷ユニットU、印刷したシートを函形状に対応して打ち抜き且つ折り曲げ線に対応して罫線を施す打抜き罫線装置(300)を有している。図2に示す如く、各印刷ユニットUは、レール(102)(102)上を移動可能に配備され、隣合う印刷ユニット間は、開閉可能であり、印刷中は、ユニット間は閉じられており、印

版の交換やメンテナンスの際に、ユニット間を開くことができる。

【0011】印刷ユニットUのフレーム(100)上部にインキ付けロール(1)と絞りロール(2)を相対的に接触離間可能に配備し、接触状態の両者の間に底部が徐々に狭まった溝状のインキ貯留部(11)を形成している。インキ付けロール(1)の下方に該ロールに接して版胴(9)が配備され、該版胴(9)の下方に受けロール(91)が配備される。上記インキ貯留部(11)には、後記するインキの供給、回収、洗浄液の供給及び洗浄廃液の回収を行う兼用ノズル(4)からインキが供給され、液面センサー(図示せず)によって液面は設定高さに制御される。公知の如く、インキ付けロール(1)と絞りロール(2)が互いにインキ貯留部(11)のインキを絞る方向に回転し、インキ付けロール(1)表面のインキが版胴(9)上の印版(図示せず)に転移し、版胴(9)と受けロール(91)との間に供給される段ボールシートSに印刷を行う。

【0012】インキ付けロール(1)は、セラミックロール、メッキロール等の硬質ロールの表面にインク溜まりとなる微細な凹凸が形成されている。絞りロール(2)は、表面がゴムで形成されている。両ロール(1)(2)の全長は、印刷機の大小によって異なるが、1.5~4.7mである。両ロール(1)(2)の両端には、前記インキ貯留部(11)の端部を塞ぐ堰部材(12)(12)が押し当てられている。

#### 【0013】ミスト室(60)

図3に示す如く、両ロール(1)(2)及び堰部材(12)はカバー(6)によって覆われ、絞りロール(2)とカバー(6)との間にミスト室(60)が形成されている。カバー(6)は、両ロール(1)(2)を収容する筐体に形成され、天井板(65)には、前記インキ貯留部(11)に対応して兼用ノズル(4)の走行用開口(61)がインキ貯留部(11)との対応位置に開設され、下面は版胴(9)に取り付けられた印版がインキ付けロール(1)に接触するための版胴侵入用開口(62)が開設されている。カバーの絞りロール(2)側の底板(63)は、インキ貯留部(11)を越えてインキ付けロール(1)側に斜め上方に屈曲し、先端縁が全長に亘ってインキ付けロール(1)に接近する塞ぎ板(63a)を有している。

【0014】カバー(6)の上面は、インキ付けロール(1)及び絞りロール(2)に接近しており、絞りロール(2)とカバー(6)との間は、絞りロール(2)とインキ付けロール(1)に対してスリット状の狭い隙間(66)(67)が開いたミスト室(60)を形成している。上記ミスト室(60)内に1又は複数基の微霧噴射ノズル(21)が配備される。微霧噴射ノズル(21)は、薄め液、実施例では水道水を微霧状に噴射してミスト室(60)を飽和状態に近い高湿度に維持することにより、絞りロール(2)表面に液の微粒子を薄膜状に付着させて積極的に濡らす(湿らす)ためのものである。微霧とは粒度が50 $\mu$ m以下であり、3

0 $\mu$ m以下とすることが望ましい。ミスト室(60)内に湿度センサー(68)が配備され、該センサーによって噴霧と噴霧停止が制御され、ミスト室(60)は飽和状態又は飽和状態に近い高湿度に維持される。

【0015】カバー(6)の上面開口(61)を貫通して、インキ貯留部(11)の端部側に薄め液を該インキ貯留部(11)に補充する薄め液供給ノズル(70)を配備する。実施例では薄め液は水道水であるが、薄め液供給ノズル(70)への配管は省略する。薄め液供給ノズル(70)は、下記の兼用ノズル(4)と一緒にインキ貯留部(11)を長手方向に移動可能に配備しても可い。

#### 【0016】兼用ノズル(4)

図2に示す如く、カバー(6)の上方に、インキ貯留部(11)に沿って横移動可能にスライド台(41)が配備され、該スライド台は制御部(図示せず)によって制御されるスライド駆動装置(図示せず)に連繋される。スライド台(41)上にはエアシリンダ等の昇降駆動装置(42)を介して兼用ノズル(4)が取り付けられ、該ノズル下端はインキ貯留部(11)に臨んでいる。兼用ノズル(4)は後記の如く、インキ貯留部(11)へのインキの供給、インキ貯留部(11)からのインキの回収、前記2本のロール(1)(2)を洗浄するための洗浄液の供給、洗浄後にインキ貯留部(11)に溜まった洗浄廃液の回収の4つの役割を兼用する。前記昇降駆動装置(42)は、兼用ノズル(4)を上昇位置、中間高さ位置及び下降位置の3段に切替可能である。上昇位置の兼用ノズル(4)の下端は、インキ貯留部(11)でのインキの設定液面高さより少し上位置である。中間位置の兼用ノズル(4)の下端は、インキ液面の設定高さより少し低い位置にある。下降位置の兼用ノズル(4)の下端は、ロール(1)(2)間に辛うじて噛み込まない程度までインキ貯留部(11)の最も深い部分に侵入する。兼用ノズル(4)の下端は、インキ貯留部(11)の底形状に対応して両ロール(1)(2)側の面が斜めにカットされて楔状に尖っている。

【0017】兼用ノズル(4)は、流通管(44)に接続される。流通管(44)は兼用ノズル(4)からユニットフレーム(100)の側壁までの区間のフレキシブルチューブ(44b)とユニットフレーム(100)の側壁の外側にて上部から下部に向かう縦管(44a)とからなる。フレキシブルチューブ(44b)は、兼用ノズル(4)の移動ストロークに対応する余裕のある長さである。縦管(44a)及びフレキシブルチューブ(44b)の内径は8~10mm程度の細管である。ひれは従来の水性速乾性インク循環式の管路の内径40mmに較べて、直径で1/4以下である。上記縦管(44a)の下端は切換弁(45)を介してインキタンク(31)と廃液回収タンク(5)に選択的に接続される。ユニットフレーム(100)の側壁下端に、載せ台(101)が外向きに突設され、該載せ台(101)に、インキタンク(31)を収容する密閉ボックス(3)と廃液回収タンク(5)が配備される。

#### 【0018】密閉ボックス(3)及びインキタンク(31)

密閉ボックス(3)はインキ供給と回収のための主要構成部品であり、内部に取出し可能にインキタンク(31)を収容している。密閉ボックス(3)は、上蓋(30)が開閉でき、該上蓋(30)の中央に貫通小孔(32)が開設されている。インキタンク(31)は、インキ販売用の容器の蓋を外したものであって、該インキタンク(31)に下端を浸けた案内管(33)が密閉ボックス(3)の貫通小孔(32)を気密に貫通して前記切換弁(45)に着脱可能に接続されている。

【0019】密閉ボックス(3)には、減圧用吸引管(35)と加圧用エア供給管(35a)が接続され、加圧用エア供給管(35a)から密閉ボックス(3)内に圧力空気を送り込むことにより、密閉ボックス(3)内の圧力を高めてインキタンク(31)内のインキを押し出して、案内管(33)、切換弁(45)、流通管(44)を通じて兼用ノズル(4)からインキ貯留部(11)にインキを供給できる。減圧用吸引管(35)にて密閉ボックス(3)内の空気を吸引し、密閉ボックス(3)内を減圧することにより、兼用ノズル(4)に吸引力を作用させ上記とは逆の経路でインキ貯留部(11)のインキをインキタンク(31)に吸引回収できる。実施例では、減圧用吸引管(35)と加圧用エア供給管(35a)は共通であって下記のエア回路(40)によって、1台のコンプレッサー(42)で、密閉ボックス(3)内を加圧と減圧に切換えできる。

#### 【0020】加圧及び減圧用エア回路(40)

図4に示す如く、エア回路(40)は、コンプレッサー(42)から第1、第2流路(400a)(400b)を分岐して形成する。第1流路(400a)は減圧、加圧共用管(35)によって密閉ボックス(3)に分岐して繋がり、エゼクター(真空発生器)(406)を介して第2流路(400b)に合流している。エゼクター(406)は、第2流路(400b)から該エゼクターへ圧縮空気を送入することにより、第1流路(400a)側を吸引して真空を発生させる公知のものである。上記エゼクター(406)から、第2流路(400b)の延長上に第3流路(400c)が延び、サイレンサー(407)を介して大気に開放されている。第1流路(400a)には、密閉ボックス(3)への分岐部(400d)とコンプレッサー(42)との間にて、上流側から順に切換弁(401)、減圧弁(402)、切換弁(403)及びエゼクター(406)側に切換弁(408)を設けている。上流側と下流側切換弁(401)(408)は、開、閉に切換できる電磁弁であり、中間の切換弁(403)は、開、閉及び大気開放に切換えできる電磁弁である。第2流路(400b)には、上流側に開、閉の切換弁(404)、下流側に減圧弁(405)を設けている。

【0021】密閉ボックス(3)に対する加圧時は、第1流路(400a)の下流側の切換弁(408)と第2流路(400b)の切換弁(404)を閉じ、第1流路(400a)の上流側及び中間の切換弁(401)(403)を開く。コンプレッサー(42)からの高速空気流が、矢印Aで示す如く、減圧弁(402)、加圧用エア供給管(35a)を通して密閉ボックス(3)に流れ、密閉ボックス(3)内を加圧する。減圧時は、第1流

路(400a)の下流側の切換弁(408)と第2流路(400b)の切換弁(404)を開き、第1流路(400a)の上流側及び中間の切換弁(401)(403)を閉じる。コンプレッサー(42)からの高速空気は、矢印Bで示す如く、第2流路(400b)から第3流路(400c)へ流れ、矢印Cで示す様に、密閉ボックス(3)側から第3流路(400c)への空気の流れが生じ、密閉圧力容器(2)内は負圧となる。第3流路(400c)から高速空気流が大気に放出される際、サイレンサー(407)を通してするため、空気放音は低くなり騒音を発しない。

尚、上記エア回路(40)は、密閉ボックス(3)内を加圧と減圧に切換えるための一例を示したものに過ぎず、エア回路は上記実施例に限るものでないことは勿論であり、加圧と減圧の切換えが速くできるほど望ましいのは当然である。

#### 【0022】廃液回収タンク(5)

廃液回収タンク(5)は、流入管(51)を介して前記切換弁(45)に接続され、底部に仕切弁(54)付きの排水口(53)を有している。廃液回収タンク(5)には、送排気管(52)を介してエア回路(50)が連繋される。エア回路(50)は、前記密閉ボックス(3)側のエア回路(40)と同様に、廃液回収タンク(5)内を減圧と加圧に切換えられる。但し廃液回収タンク(5)側のエア回路(50)のコンプレッサー(42)は、密閉ボックス(3)側のエア回路(40)のコンプレッサーと共用であって、切換弁(409)の切換で、1台のコンプレッサー(42)で2つのエア回路(40)(50)を選択的に動作させる。廃液回収タンク(5)は、後記の如く、インキ貯留部(11)に溜まった洗浄廃液を溜めて、仕切弁(54)を開いて排出するものであり、廃液回収タンク(5)内を加圧せずとも洗浄廃液の排出はできる。従って、エア回路(50)に廃液回収タンク(5)内を加圧する機能を持たせることは必須ではない。廃液回収タンク(5)から洗浄廃液を排出する際に、該タンク内を加圧すれば排出時間が短縮される利点はある。

#### 【0023】洗浄液供給管(7)

前記切換弁(45)から兼用ノズル(4)に向かう流通管(44)に、切換弁(45)に接近して洗浄液供給管(7)が接続される。実施例では、洗浄液は水道水であって、水道配管を仕切弁(71)を介して流通管(44)に接続して洗浄液供給管(7)となしている。

#### 【0024】インキ粘度検出手段(8)

流通管(44)には洗浄液供給管(7)よりも兼用ノズル(4)側にてインキ粘度検出手段(8)が配備されている。インキ粘度検出手段(8)は、流通管(44)の近傍にインキ溜め小ポット(81)を配備し、流通管(44)から該ポット(81)にインキ供給管(82)、ポット(81)から流通管(44)にインキ戻し管(83)を接続する。インキ供給管(82)とインキ戻し管(83)には夫々仕切弁(84)(85)が設けられている。ポット(81)には、ザーンカップ(86)がポット(81)に対して相対的に上下方向に移動可能に配備されている。仕切弁(84)(85)の操作により、ポット(81)にインキを溜め、ポ

ット(81)に浸かったザーンカップ(86)をポット(81)に対して相対的に上昇させ、ザーンカップ(86)の底面の小孔からポット(81)に垂れ落ちるインキを検出器(86a)(86b)で検出し、垂れ落ち終了までの時間によって、インキの粘度を測るものである。インキ粘度の計測は、印刷運転中は定期的に或いは所望のタイミングで行い、インキ粘度が設定よりも高くなれば制御部(図示せず)に信号を送り、インキの使用量と供給量に応じて、インキ貯留部(11)内のインキが薄まり過ぎない範囲で、前記薄め液供給ノズル(70)からインキ貯留部(11)に、或いは、密閉ボックス(3)を気密に貫通してインキタンク(31)に通じる薄め液供給パイプ(図示せず)からインキタンク(31)内に薄め液を供給する。

#### 【0025】インキ回収・洗浄廃液回収モードとインキ循環モード

前記兼用ノズル(4)のスライド駆動装置(図示せず)は、少なくともインキ回収・洗浄廃液回収モードと、インキ循環モードの2つのモードに切換可能である。インキ回収・洗浄液回収モードは、兼用ノズル(4)をインキ貯留部(11)の全長に亘って1又は複数回往復走行させる。インキ循環モードは、印刷運転中のモードであって、図5Aに示す様に、インキ貯留部(11)の中央部に待機していた兼用ノズル(4)を、図5Bに示す如く、インキ貯留部(11)の一端へ移動させ、該移動位置からインキ貯留部(11)の中央側に所定区間、実施例では約50cmスライドさせる。次に図5Cに示す如く、密閉ボックス(3)をインキ貯留部(11)の他端へ移動させ、該移動位置からインキ貯留部(11)の中央側に所定区間スライドさせる。次に密閉ボックス(3)を該スライド区間から離れた位置、実施例ではインキ貯留部(11)の中央に移動させ、ここで一旦停止させる。印刷運転中はこのサイクルを繰り返す。兼用ノズル(4)は、上記2つの運転モードの終了時には、インキ貯留部(11)の長さ方向の中央で待機する。

【0026】次に、空のインキ貯留部(11)へのインキ供給、印刷運転中の兼用ノズル(4)の動作、インキの色替えに伴うロール(1)(2)の洗浄、インキタンク(31)の交換について説明する。

#### 【0027】インキ供給

空のインキ貯留部(11)にインキを供給するには、密閉ボックス(3)内をエア回路(40)の働きによって加圧し、スライド駆動装置(図示せず)によって上昇位置の兼用ノズル(4)をインキ貯留部(11)に沿ってスライドさせる。インキタンク(31)から押し出されたインキは、兼用ノズル(4)からインキ貯留部(11)に排出される。このときインキ付けロール(1)及び絞りロール(2)は回転させておき、インキ液面の線がロール(1)(2)に付着することを防止すると共に、インキに刺激を与えて攪拌効果を得る。設定液面高さまでインキが供給されれば、液面センサーの働きによりインキ供給が停止され、兼用ノズル(4)は一旦インキ貯留部(11)の中央に戻る(図5A)。

#### 【0028】印刷運転の兼用ノズル(4)の動作

インキ付けロール(1)及び絞りロール(2)を回転して印刷運転を開始すると、制御部(図示せず)に組み込まれたプログラムにより下記の動作を行う。ノズル(4)はインキ貯留部(11)の一端側付近へ移動し、中間高さ位置に下降し先端をインク溜まり部(11)に浸ける。ノズル(4)はその移動位置からインキ貯留部(11)の中央側へ約50cm移動する。この50cmの移動の間に密閉ボックス(3)を負圧にして、インキ貯留部(11)のインキをインキタンク(31)に吸引回収する(図5B)。兼用ノズル(4)がインキ貯留部(11)の端部の回収区間でインキを吸引回収すると、該回収区間の液面が下がってインキ貯留部(11)の中央側から回収区間へインキが移動し、インキの流れが生じる。

【0029】次に、インキの吸引回収を停止し、ノズル(4)を上昇させて、インキ貯留部(11)の反対側の端部に移動させる。その移動位置から前記同様の区間だけノズル(4)を中間高さ位置まで下降させてインキを吸引回収させながら横移動させる。前記同様にして該回収区間の液面が下がってインキ貯留部(11)の中央側からインキが移動し、インキ貯留部(11)でインキの流れが生じる。

【0030】次に、インキの吸引回収を停止した状態でノズル(4)上昇させ、吸引回収位置から離れた位置に移動させ、実施例ではインキ貯留部(11)の中央部に移動させ、その位置で密閉ボックス(3)を加圧してノズル(4)からインキ貯留部(11)にインキを供給する。液面センサーにより、液面は設定高さ以上にはならない。印刷運転中は、上記サイクルを繰り返して、インキ貯留部(11)とインキタンク(31)との間でインキを循環させる。

#### 【0031】インキ回収

インキ替えを行うには、インキ貯留部(11)の残存インキを回収する。ロール(1)(2)の回転を停止し、昇降駆動装置(42)によって兼用ノズル(4)をインキ貯留部(11)の最も深い位置まで下降させる。ロール(1)(2)の回転を停止するのは、ロール間への兼用ノズル(4)(5)の噛み込みを防止するためである。兼用ノズル(4)をスライドさせつつ貯留部(11)内のインキを吸引回収する。真空圧によってインキを吸引回収する方式であるから、兼用ノズル(4)をインキ貯留部(11)の全長に亘って1、2回往復させれば、インキ貯留部(11)内の殆どの量のインキを吸引回収できる。又、兼用ノズル(4)から切換弁(45)に至る流通管(44)内面に極薄膜状に残存するインキは極めて微量である。

#### 【0032】ロール洗浄

切換弁(45)を切り換えて、流通管(44)を密閉ボックス(3)及び廃液回収タンク(5)と遮断する。兼用ノズル(4)を上昇させた状態で、ロール(1)(2)を回転させる。洗浄液供給管(7)の仕切弁(71)を開き兼用ノズル(4)からインキ貯留部(11)に洗浄液を供給する。洗浄液は流通管(44)を通して兼用ノズル(4)から放出されるた

め、流通管(44)内が洗浄される。ロール(1)(2)の回転により、ロール(1)(2)に薄膜状に付着していたインキは殆ど洗い流され、又、貯留部(11)自体も洗浄される。インキ付けロール(1)に薄膜状に付着しているインキ及びインキ貯留部(11)の壁面に残存するインキ量は微量であり、且つインキは水性であるから、洗浄に要する洗浄液の量は僅かで済む。

【0033】ロール(1)(2)の回転を停止し、兼用ノズル(4)をインキ貯留部(11)の最も深い位置まで下降し、この状態で、切換弁(45)を廃液回収タンク(5)に連通する様に切換え、エアー回路(50)によって廃液回収タンク(5)を減圧する。兼用ノズル(4)に吸引力が作用し、インキ貯留部(11)内の洗浄廃液が兼用ノズル(4)から廃液回収タンク(5)に回収される。このとき、インキ粘度検出手段(8)のインキ供給管(82)とインキ戻し管(83)の両仕切弁(84)(85)を開いておくことにより、洗浄廃液は流通管(44)からインキ粘度検出手段(8)に分岐して流れ、再び流通管(44)に戻って廃液回収タンク(5)に回収されるから、インキ粘度検出手段(8)の洗浄も行われる。前記の如く、インキ替えの際に、殆どロスなくインキ回収ができ、それに伴ってロールの洗浄に要する洗浄液は少量で済み、且つ、洗浄廃液の濃度も低いため、洗浄廃液の処理のために大がかりな設備を必要とせず、廃液処理のためのランニングコストを抑えることができる。

#### 【0034】インキタンクの交換

密閉ボックス(3)が切換弁(45)によって流通管(44)と遮断されている間に、インキタンク(31)の交換を行う。これは、インキタンク(31)だけではなく、切換弁(45)へ繋がる案内管(33)を含めて行う。案内管(33)は密閉ボックス(3)の貫通小孔(32)から抜き外す。密閉ボックス(3)が実施例の様に低位置に置かれている場合、密閉ボックス(3)を上開きとすれば、インキタンク(31)の出し入れが便利である。図2、図4では、密閉ボックス(3)の蓋(30)の開閉、案内管(33)の抜き外し、及び密閉ボックス(3)に対するインキタンク(31)の出し入れに、切換弁(45)が邪魔になるが、互いに邪魔にならない位置関係とし、又、案内管(33)の一部或いは全体をフレキシブル管とすれば、案内管(33)及びインキタンク(31)の交換に支障はない。インキタンク(31)及び案内管(33)を交換し、案内管(33)を切換弁(45)に接続すれば、再び切換弁(45)をインキタンク(31)側に切換えて、前記同様にして、エアー回路(40)の働きによって密閉ボックス(3)を加圧し、インキをインキ貯留部(11)に供給する。

#### 【0035】ミスト室(60)の動き

上記インキ供給及び印刷運転中は、微霧噴射ノズル(21)(21)から薄め液を噴射して絞りロール(2)表面を薄め液の微粒子で覆って積極的に濡らす(湿らせる)と共に、ミスト室(60)に微霧を充満させる。ミスト室(60)は、微霧で飽和状態に近い高湿度に維持されているから、絞りロール(2)の回転により、ロール表面を覆う薄め液の微粒

子がインキ貯留部(11)に連続して持ち込まれる。インキ貯留部(11)にインキ薄め液を直接に滴下した場合、薄め液とインキの比重、粘性等の特性の相違によって薄め液は直ぐにはインキに馴染まず、混じり難いが、絞りロール(2)周囲を薄め液の微粒子で薄膜状に濡らしてこの濡れをロールの回転によりインキ貯留部(11)に持ち込むことにより、絞りロール(2)表面の濡れの水分がインキ貯留部(11)のインキと直ぐに馴染んで上手く混ざり、インキの粘度に斑を生じることはない。微霧噴射ノズル(21)(21)を絞りロール(2)の下方にて少し該ロール側に傾けて配備することにより、一層積極的に絞りロール(2)の表面を濡らす効果がある。又、ミスト室(60)の絞りロール(2)上方の狭い出口(66)から逃げ出す微霧がインキ貯留部(11)近傍を高湿雰囲気にするため、インキ貯留部(11)の水分蒸発を抑えてインキの粘度上昇を防止する。

#### 【0036】実施例の効果

上記の様に、インキの交換の際、インキタンク(31)と案内管(33)を1つのセットとして取り替えるため、案内管(33)の内面に薄い膜状に付着したインキが、次のインキタンクのインキと混ざることはない。又、ロール洗浄の際に、兼用ノズル(4)を含む切換弁(45)までの流通管(44)には、洗浄液及び洗浄廃液が流れるから、該管路を別個に洗浄する必要はなく、インキの色替えの都度該管路を交換する必要はない。従って、管路を印刷の外側へ引き出し、密閉ボックス(3)を印刷機の外側に配置し、インキタンクを印刷機の外側で交換することが可能となる。密閉ボックス(3)を印刷機の設置床面近くに配置したため、インキタンクを高く持ち上げることなく交換できる。インキタンクの交換のために、隣合う印刷ユニットを離間させる必要はない。インキの供給・回収、洗浄液供給、洗浄廃液の回収を共通のノズルで行うため、配管が簡素できる。

【0037】尚、実施例では、インキの供給、回収、洗浄廃液の回収路である流通管(44)に洗浄液供給管(7)を接続したが、洗浄液をインキ付けロール(1)に直接に滴下させることもでき、この場合は、洗浄液の供給は別配管とする。洗浄液が流通管(44)を通過せずとも、洗浄廃液が流通管(44)を通過するだけでも、流通管(44)の内面に付着していたインキは洗い流されるから問題はない。

【0038】実施例の様に、兼用ノズル(4)から洗浄液を供給すると、兼用ノズル(4)から直接に空のインキ貯留部(11)に洗浄液が供給されてしまうが、兼用ノズル(4)に角度調整装置或いはインキ付けロール(1)側への移動装置(何れも図示せず)を連繋して兼用ノズル(4)からインキ付けロール(1)へ直接に洗浄液を滴下して、インキ付けロールの表面の微細な凹凸を効果的に洗い流すこともできる。

【0039】上記実施例では、図3に示す、印刷運転中のインキ回収とインキ供給によるインキ循環サイクルにおいて、兼用ノズル(4)にてインキ貯留部(11)の端部を



一定区間走行させながらインキを回収したが、兼用ノズル(4)をインキ付けロール(1)の端部側で停止状態で吸引回収しても可く、インキ循環サイクルにおけるインキの吸引回収では必ずしも兼用ノズル(4)を一定区間走行させる必要はない。

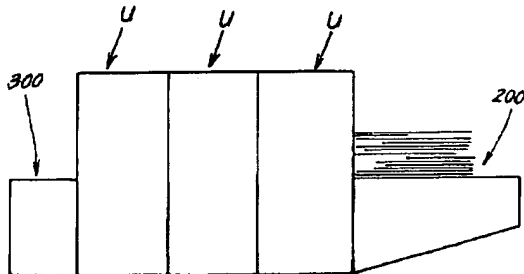
【0040】又、上記実施例では、インキ付けロール(1)上のインキを絞る絞り部材(20)として絞りロール(2)を用いたが、これに限定されることなく、図6に示す如く、インキ付けロール(1)に対して該ロールの全長に亘って帯状板(22)を押圧接触させ、両者の間にインキ貯留部(11)を形成することもできる。

【0041】本発明は、水性インキに限らず、低粘度で乾燥速度も良好なグリコール系インキに対しても実施できるのは勿論であり、上記実施例の構成に限定されることなく、特許請求の範囲に記載の範囲で種々の変更が可能である。

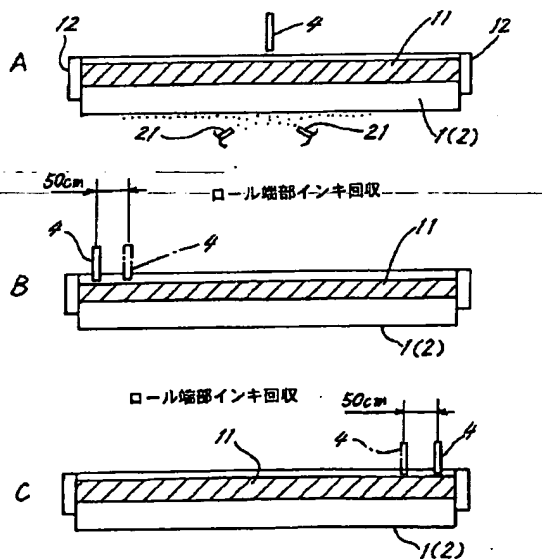
【図面の簡単な説明】

【図1】印刷機の概略正面図である。

【図1】



【図5】



【図2】印刷ユニットの一部を破断した斜面図である。

【図3】印刷ユニットのインキ貯留部近傍の断面図である。

【図4】密閉ボックスと廃液回収タンクに対するインキ供給、回収、洗浄液供給、洗浄廃液回収の管路及び、加圧、減圧エア回路の説明図である。

【図5】兼用ノズルの動作説明図である。

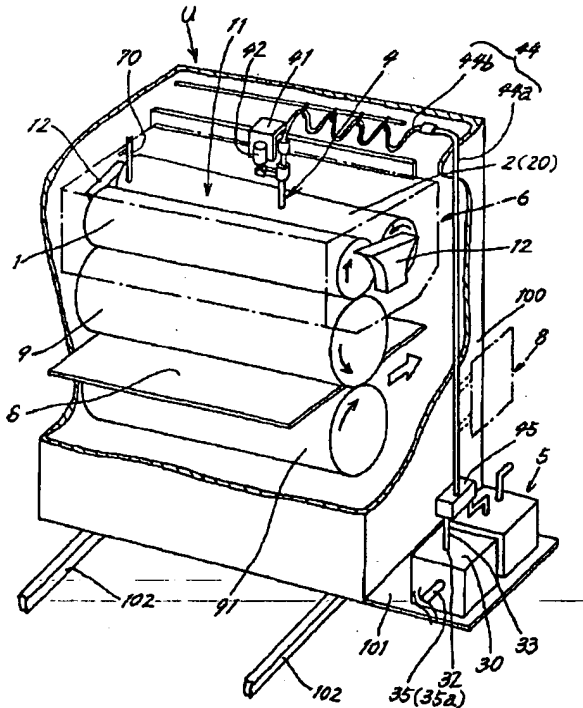
【図6】インキ付けロールに対する絞り部材の他の実施例の断面図である。

【図7】従来の速乾性インキの循環路の説明図である。

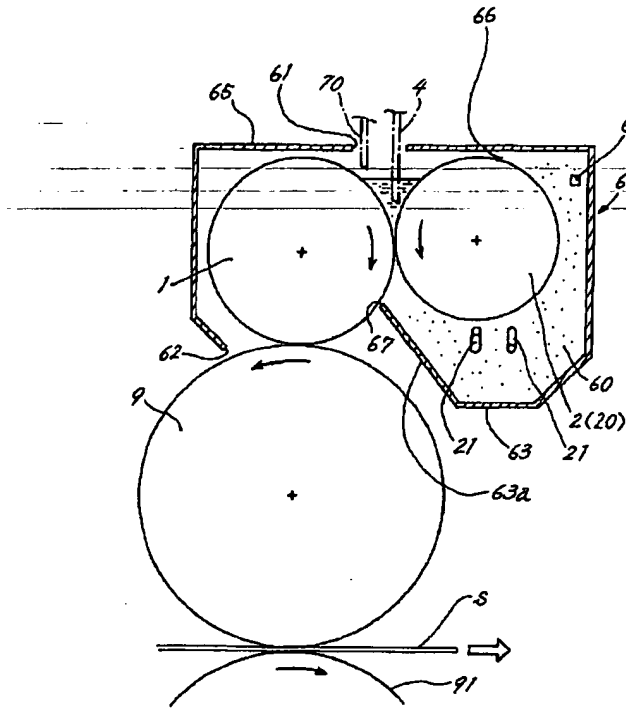
【符号の説明】

- (1) インキ付けロール
- (11) インキ貯留部
- (2) 絞りロール
- (3) 密閉ボックス
- (31) インキタンク
- (4) ノズル
- (5) 廃液回収タンク

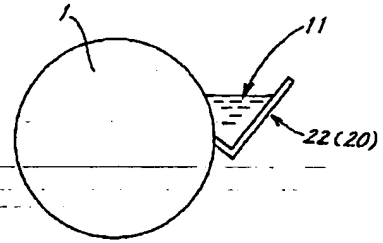
【図2】



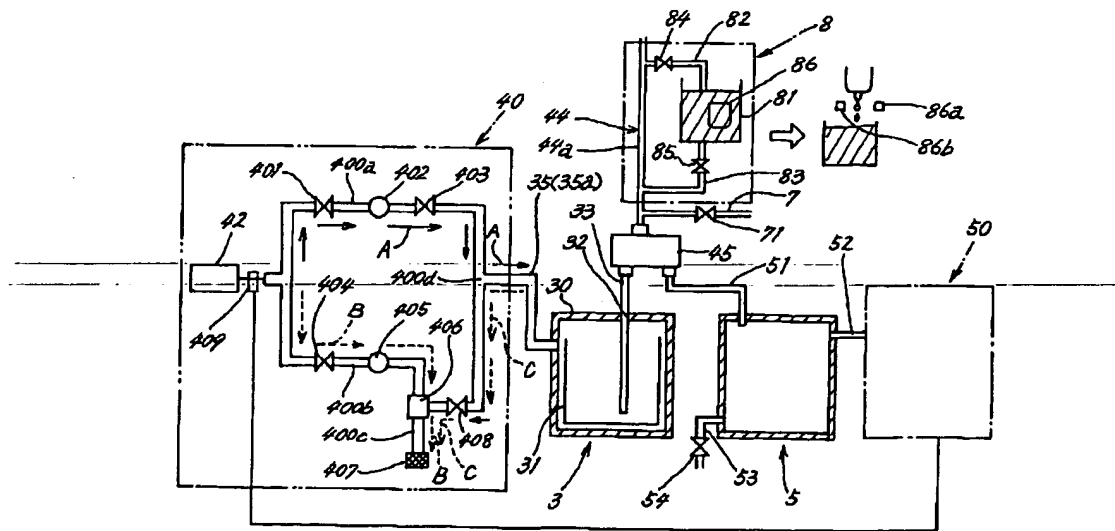
【図3】



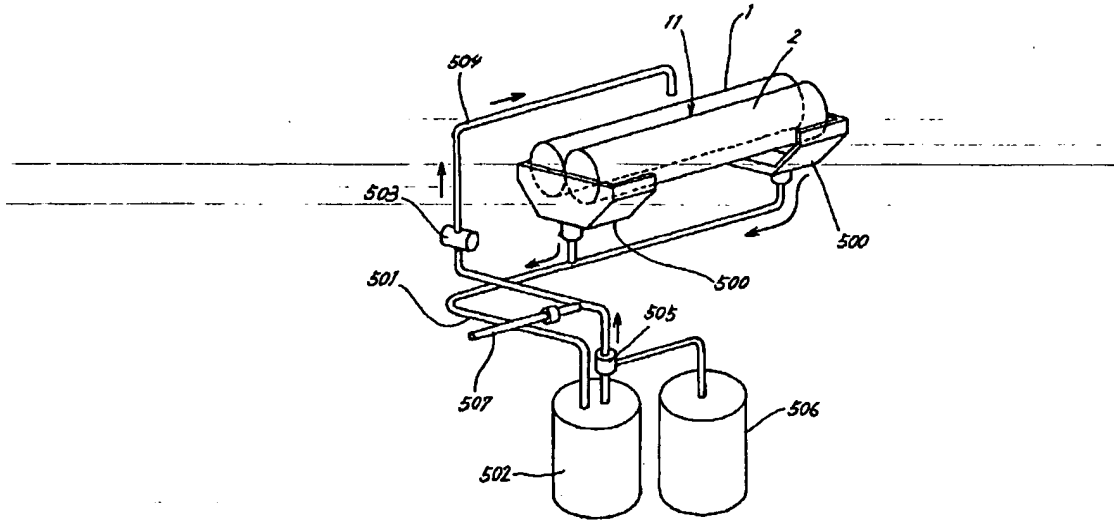
【図6】



【図4】



【図7】



## 【手続補正書】

【提出日】平成14年1月11日（2002. 1. 11）

## 【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】0009

【補正方法】変更

## 【補正内容】

【0009】インキタンク(31)を印刷機の外側で交換できるため、インキタンクの交換のために隣合う印刷ユニットを離間させる必要はなくなる。従って、印刷稼働中でもインキタンクを交換して順次インクを補充出来、印刷機の稼働率を高めることができる。インキの色替えの際も、隣合う印刷ユニットを離間させる必要はなくなる。インキの色替えの際に、兼用ノズル(4)を含む流通管(44)は交換せずに済むため、この点でも、インキ替えの段取りを迅速に行うことができる。密閉ボックス(3)を印刷機の設置床面近くに配置することにより、インキタンク(31)を高く持ち上げることなくインキタンクの交換できる。インキの供給・回収、洗浄廃液の回収を共通のノズルで行うため、配管が簡素化できる。

## 【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】0011

【補正方法】変更

## 【補正内容】

【0011】印刷ユニットUのフレーム(100)上部にインキ付けロール(1)と絞りロール(2)を相対的に接触離間可能に配備し、接触状態の両者の間に底部が徐々に狭

まった溝状のインキ貯留部(11)を形成している。インキ付けロール(1)の下方に該ロールに接して版胴(9)が配備され、該版胴(9)の下方に受けロール(91)が配備される。上記インキ貯留部(11)には、後記するインキの供給、回収、洗浄液の供給及び洗浄廃液の回収を行う兼用ノズル(4)からインキが供給され、液面センサー(図示せず)によって液面は設定高さに制御される。公知の如く、インキ付けロール(1)と絞りロール(2)が互いにインキ貯留部(11)のインキを絞る方向に回転し、インキ付けロール(1)表面のインキが版胴(9)上の印版(図示せず)に転移し、版胴(9)と受けロール(91)との間に供給される段ボールシートSに印刷を行う。

## 【手続補正3】

【補正対象書類名】明細書

【補正対象項目名】0017

【補正方法】変更

## 【補正内容】

【0017】兼用ノズル(4)は、流通管(44)に接続される。流通管(44)は兼用ノズル(4)からユニットフレーム(100)の側壁までの区間のフレキシブルチューブ(44b)とユニットフレーム(100)の側壁の外側にて上部から下部に向かう縦管(44a)とからなる。フレキシブルチューブ(44b)は、兼用ノズル(4)の移動ストロークに対応する余裕のある長さである。縦管(44a)及びフレキシブルチューブ(44b)の内径は8～10mm程度の細管である。これは従来の水性速乾性インク循環式の管路の内径40mmに較べて、直径で1/4以下である。上記縦管(44a)の下端は切換弁(45)を介してインキタンク(31)と廃液回収

タンク(5)に選択的に接続される。ユニットフレーム(100)の側壁下端に、載せ台(101)が外向きに突設され、該載せ台(101)に、インキタンク(31)を収容する密閉ボックス(3)と廃液回収タンク(5)が配備される。

【手続補正4】

【補正対象書類名】明細書

【補正対象項目名】0028

【補正方法】変更

【補正内容】

【0028】印刷運転の兼用ノズル(4)の動作

インキ付けロール(1)及び絞りロール(2)を回転して印刷運転を開始すると、制御部(図示せず)に組み込まれたプログラムにより下記の動作を行う。ノズル(4)はインキ貯留部(11)の一端側付近へ移動し、中間高さ位置に下降し先端をインキ貯留部(11)に浸ける。ノズル(4)はその移動位置からインキ貯留部(11)の中央側へ約50cm移動する。この50cmの移動の間に密閉ボックス(3)を負圧にして、インキ貯留部(11)のインキをインキタンク(31)に吸引回収する(図5B)。兼用ノズル(4)がインキ貯留部(11)の端部の回収区間でインキを吸引回収すると、該回収区間の液面が下がってインキ貯留部(11)の中央側から回収区間へインキが移動し、インキの流れが生じる。

【手続補正5】

【補正対象書類名】明細書

【補正対象項目名】0036

【補正方法】変更

【補正内容】

【0036】実施例の効果

上記の様に、インキの交換の際、インキタンク(31)と案内管(33)を1つのセットとして取り替えるため、案内管(33)の内面に薄い膜状に付着したインキが、次のインキタンクのインキと混ざることはない。又、ロール洗浄の際に、兼用ノズル(4)を含む切換弁(45)までの流通管(44)には、洗浄液及び洗浄廃液が流れるから、該管路を別個に洗浄する必要はなく、インキの色替えの都度該管路を交換する必要はない。従って、管路を印刷機の外側へ引き出し、密閉ボックス(3)を印刷機の外側に配置し、インキタンクを印刷機の外側で交換することが可能となる。密閉ボックス(3)を印刷機の設置床面近くに配置したため、インキタンクを高く持ち上げることなく交換できる。インキタンクの交換のために、隣合う印刷ユニットを離間させる必要はない。インキの供給・回収、洗浄液供給、洗浄廃液の回収を共通のノズルで行うため、配管が簡素化できる。